Dental Abstracts

a selection of world dental literature

AMERICAN DENTAL ASSOCIATION

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Lon W. Morrey, D.D.S., editor
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AMERICAN DENTAL ASSOCIATION

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2. To provide, by a few hours' reading each month, a survey of the significant advances being made by dentistry throughout the world, as reflected in current dental literature; and

3. To supply enough data in each abstract so that the reader may determine whether he wishes to refer to the original article for more complete information.

The abstracts are grouped in broad classifications. The specialist will learn from this periodical of work done in other fields as well as in his own. The general practitioner will be able to keep abreast of modern knowledge in the various specialties. Articles from which abstracts have been made are on file in the Library of the American Dental Association and may be borrowed by members of the Association. Requests for articles should be addressed to the Bureau of Library and Indexing Service, American Dental Association, 222 East Superior Street, Chicago 11, Illinois. Only three articles may be borrowed at one time, and they may not be kept longer than one week. No charge is made to Association members for this service.

Armamentarium

▼

Instruments

Cutting characteristics of dental burs as shown by high-speed photomicrography

Jack L. Hartley, Donald C. Hudson,
William T. Sweeney and Warren P. Richardson.
U.S.Armed Forces M.J. 8:209-218
Feb. 1957

As part of a continuing study of rotating dental burs, a program was initiated involving high-speed photography of these instruments as they rotate under load in contact with the test materials, human enamel and dentin. High-speed motion-picture photography of dental burs under actual cutting conditions permits detailed slow-motion study of the action of each bur blade throughout the cycle of rotation.

In enamel, neither steel nor carbide instruments produced true chips, as would be expected from a milling-type cutter. In dentin, both steel and carbide burs produced true chip formation.

These photographic studies, when combined with the conventional laboratory testing methods, provide a new and more complete approach to the study and design of rotating dental cutting instruments.

A bur evaluating machine was constructed at the U.S. Air Force School of Aviation Medicine, Randolph Field, Tex., shipped to the National Bureau of Standards, and modified to permit placement of cameras above the specimen. Two-microsecond-flash still photographs were made of dental burs cutting glass and cast resin at 5,000 rpm with a load of 300 Gm. Slow-motion studies employing high-speed motion-picture cameras at 3,000, 7,000 and 14,000 feet per second were

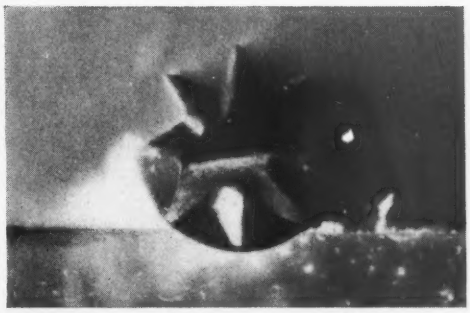


Figure 1 Right: A no. 559 tungsten-carbide bur cutting a glass microscope slide. A pulverizing action rather than true chip formation occurred

Figure 2 Below, left: A new, unused steel bur. Note the curled, drawn edges

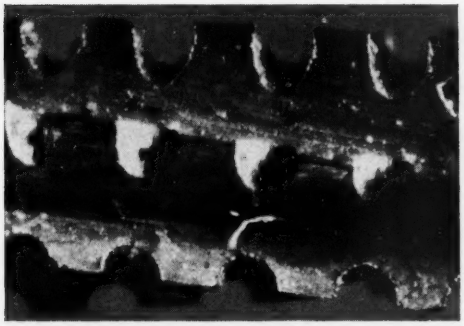
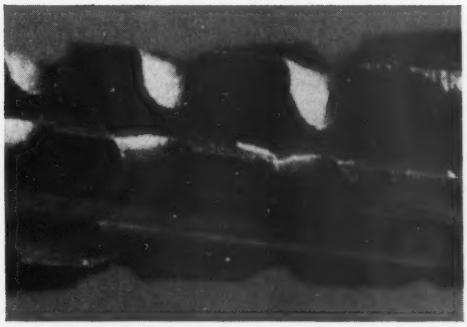


Figure 3 Below, right: Note the clean-cut edges and lack of debris-holding surfaces on this new, unused carbide bur



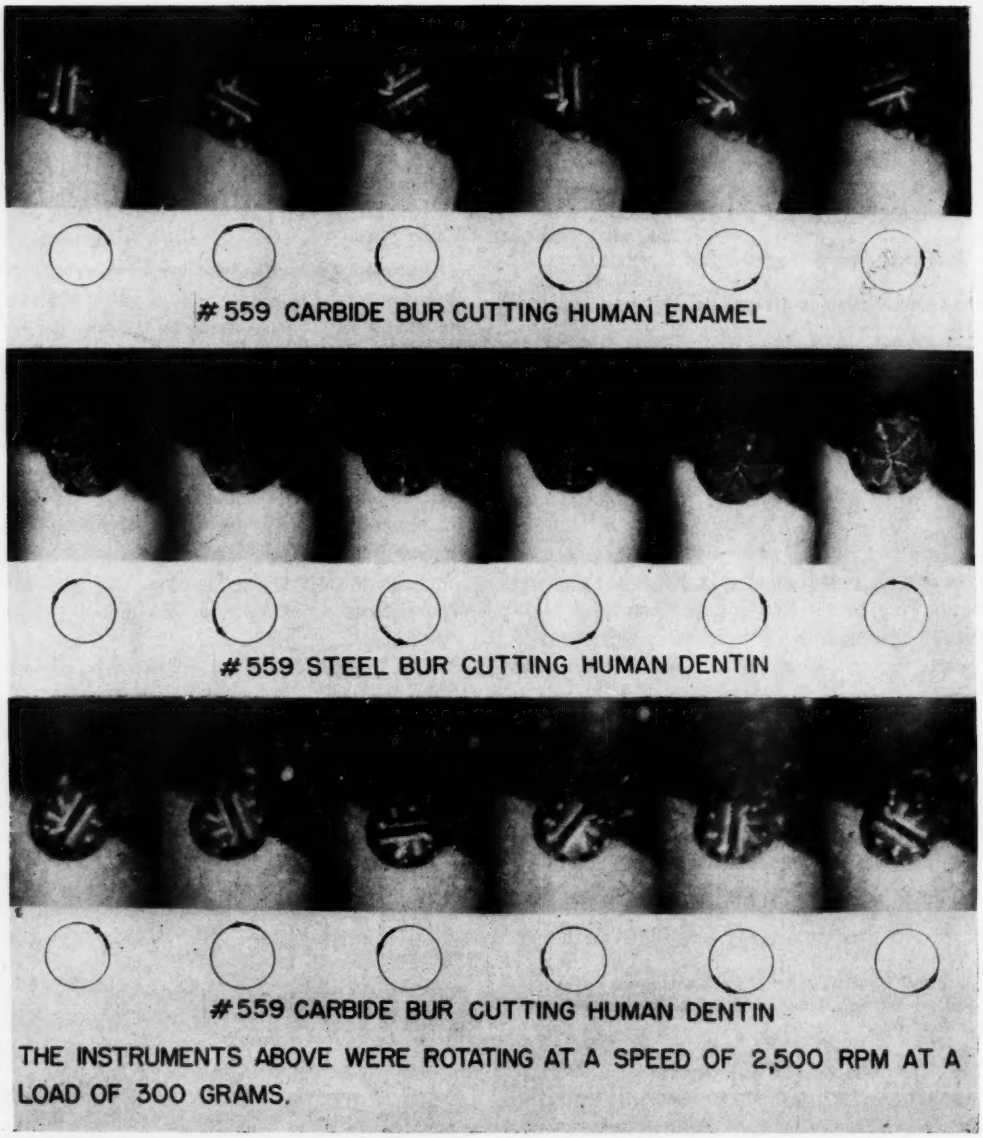

#559 CARBIDE BUR CUTTING HUMAN ENAMEL
#559 STEEL BUR CUTTING HUMAN DENTIN
#559 CARBIDE BUR CUTTING HUMAN DENTIN
THE INSTRUMENTS ABOVE WERE ROTATING AT A SPEED OF 2,500 RPM AT A LOAD OF 300 GRAMS.

Figure 4 Top row: An eccentric no. 559 tungsten-carbide bur cutting human enamel. Middle row: A no. 559 steel bur cutting human dentin and producing chip formation. Bottom row: A no. 559 tungsten-carbide bur, slightly out of round, cutting human dentin

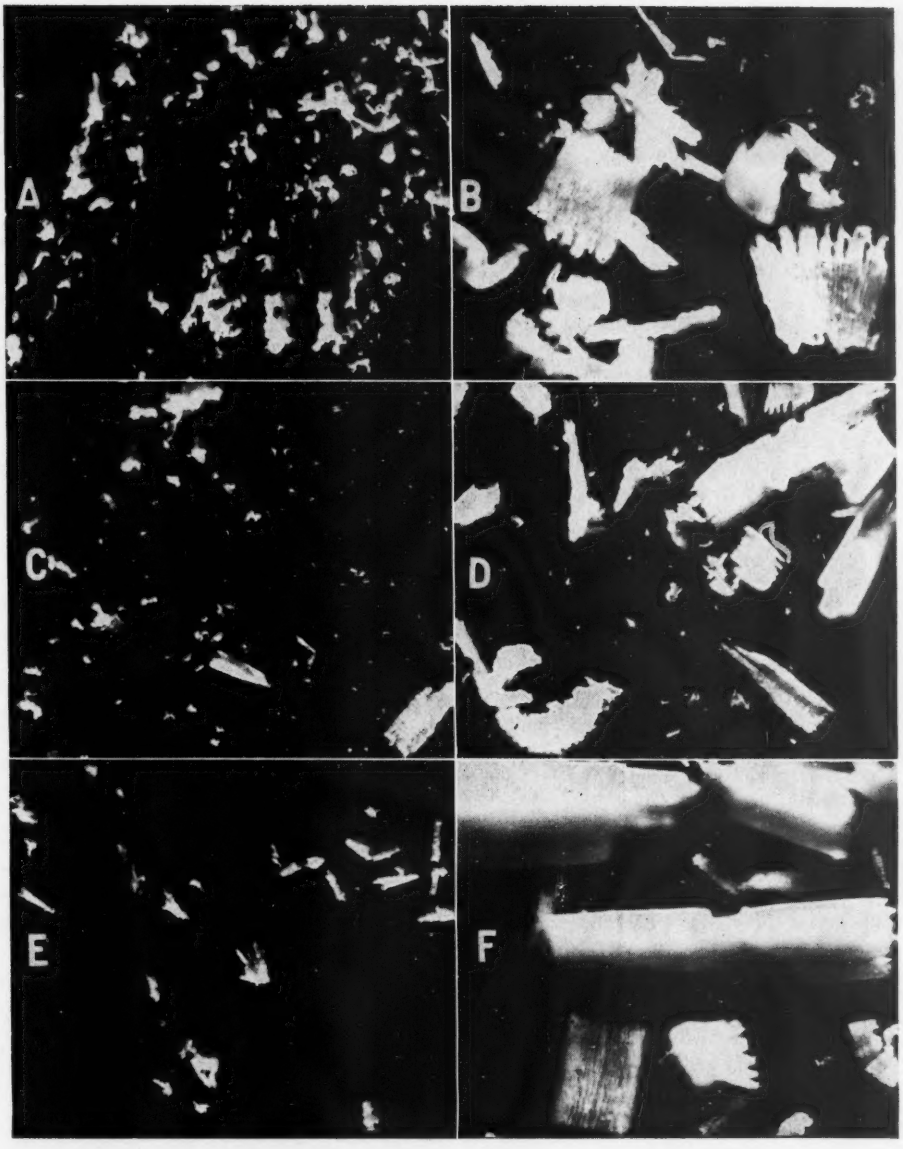


Figure 5 Dentin and enamel chips produced by new no. 558 burs. (A) Steel bur in enamel. (B) Steel bur in dentin. (C) Carbide bur in enamel. (D) Carbide bur in dentin. (E) Carbide bur in enamel. (F) Carbide bur in dentin

made of steel and carbide burs running at 2,500, 5,000 and 10,000 rpm with a load of 300 to 500 Gm. The materials cut were human enamel, dentin and test substitutes for tooth structure. The action occurring within a second was extended to about three minutes for study by projecting at 24 feet per second. These methods permitted observations of clogging, intermittent cutting and eccentric rotation.

Interpretation of the photograph of a no. 559 tungsten-carbide bur cutting a glass microscope slide (Fig. 1) indicated that a pulverizing action rather than a true chip formation occurred. The powdered glass debris accumulated on the entrant side of the excavation. This phenomenon possibly explains clogging of the bur, in that the debris was not thrown out at the exit side but was carried around to the entrant side of the excavation, where it was occasionally picked up and carried back through the cut.

A photograph of a similar bur cutting a cast resin (used as a substitute for dentin) revealed true chip formation. The chips accumulated on the exit side of the excavation.

The top row of pictures in Figure 4 shows the sequence of events, from left to right, as a no. 559 eight-bladed tungsten-carbide bur cut human enamel at 2,500 rpm with a 300 Gm. load. This bur was 0.003 inch eccentric. It can be seen that only four blades were cutting, and that in one phase of its rotation the bur was not in contact with the tooth. Some of the finely powdered debris followed the vortex of air about the bur and was carried back into the excavation. The bulk of the cut material accumulated at the exit side.

In the middle row is seen a no. 559, six-bladed steel bur cutting human dentin. Definite chip formation is shown, although the chips are fragmented and tend to follow the instrument as it rotates. The bottom row illustrates the cutting cycle of a no. 559 tungsten-carbide bur in dentin. The instrument was 0.003 inch out of round, or eccentric; consequently, the cutting action was intermittent, as observed in all eccentric burs studied.

In slow-motion pictures obtained in this investigation, chip formation is revealed in detail, so that the manner of operation of various types of bur-blade designs can be studied. At 10,000 rpm, a definite improvement in clearance of debris is noted. The effect of improper design is readily seen in some carbide burs, which are observed to cut poorly even though they do not dull.

Perhaps the superior workmanship of carbide burs in general, noted on comparative microscopic examination of steel and carbide instruments, is a factor affecting the cutting ability of the two types. Curled edges, seen on the steel bur (Fig. 2), rapidly dull and break. Burs of tungsten-carbide present a clean, well-machined appearance. Neither steel nor carbide burs, however, although designed as milling-type cutters, appear to operate efficiently in a material as hard as human enamel. No true chips are seen to form as these instruments cut tooth enamel.

School of Aviation Medicine, Randolph Air Force Base, Texas

▼ Materials

Gallium as a substitute for mercury

(Gallium statt Quecksilber)

E. Düringer. *Zahnärztl.Welt & Reform* 11/57:409 Nov. 10, 1956

Gallium, chemical symbol Ga, element number 31, atomic weight 69.72, density 5.91, melting point 29.5° C. and boiling point 2,071° C., belongs to Group 3-B of the periodic table. This element is closely associated with indium and thallium, all three metals forming a triad with properties related to aluminum and boron.

Gallium is widely distributed in nature, usually in traces in the ores of iron, lead and zinc. It is a whitish metal, somewhat ductile and malleable and appears to be stable in the air at room temperature. It reacts with water at boiling temperature, and with the halogens, the acids and sodium hydroxide.

In dental literature, many authors have held that the mercury in amalgam fillings is highly injurious and often toxic.

American researchers have established that gallium combines readily with most other ele-

ments, especially metals, and that the gallium alloys harden as quickly as amalgam.

Several gallium compounds and alloys have been examined thoroughly to establish whether they can be used in dental practice for fillings, replacing amalgam. It was established that the properties of the 25 per cent gallium and nickel alloy were superior to most binary, ternary and quaternary amalgams. The natural expandibility of gallium-nickel alloy is from 140 to 150 microns per centimeter, and thereby a substantial saving of the dentist's working time is obtainable.

By the addition of cobalt and silicon, in powdered form, the expansivity is reduced and the hardness decreased.

Although all investigations of the applicability of gallium alloys as a possible replacement for amalgams have been encouraging, further research and biologic examinations are necessary to establish whether the reactions of living tissue to these alloys are favorable.

No irritant property exists in gallium alloys and they have no toxic effects.

Wilckenstrasse 3, Heidelberg, Germany

A report on a resin composition capable of bonding to human dentin surfaces

M. Buonocore, William Wileman and Finn Brudevold. *J.D.Res.* 35:846-851 Dec. 1956

Presently available filling materials have no appreciable adhesion to tooth structure in the mouth. Restorative materials capable of forming strong bonds to tooth structure would offer many advantages. A series of *in vitro* experiments is reported on a resin material capable of forming strong bonds to dentin surfaces.

Adhesion in the laboratory tests was studied on "wet" specimens, that is, on dentin or enamel surfaces that had been stored in water and which, prior to use, were thoroughly wiped with an absorbent material and further dried with compressed air for several seconds. Adhesion was evaluated by noting the resistance offered by the material to removal by pressure applied with a sharp instrument. Preliminary tests indicated that with one exception the acrylic resin materials had little or no adhesion to "wet" dentin surfaces. One material that seemed, qualitatively, to produce better adhesion was "Sevriton" filling resin.

A mixture was selected that, when catalyzed, produced in from five to eight minutes a hard resin that formed a strong bond to "wet" dentin surfaces and which had excellent resistance to water immersion. The mixture consisted of the following ingredients mixed in the order given: (1) "Sevriton" cavity seal liquid 0.400 Gm.; (2) methyl methacrylate polymer 0.040 Gm. plus 2 per cent benzoyl peroxide; (3) methyl methacrylate monomer 0.100 Gm., and (4) "Sevriton" catalyst 0.050 Gm. Although the resin produced had excellent adhesion to dentin, it was brittle and gelled quickly. Best results were obtained by placing the mix on the tooth surface just before the mix gelled.

A method was developed to test the adhesion of the resin mix to the tooth structure. The adhesive strength of the bond was obtained by measuring the force in kilograms per square centimeter, applied at right angles to the dentin surface, required to separate the acrylic-matrix combination from the dentin surface. Readings were taken one hour after placing the assemblies in water, and at intervals of up to three months.

The greatest loss in adhesion occurred during the first 15 days, after which time the results seemed to level off.

To test the hypothesis that adhesion of the standard acrylic resins might be increased if the dentin surfaces were previously treated with acid, such surfaces were treated with one drop of a 7 per cent hydrochloride solution for one minute prior to application of the various acrylic resin filling materials tested. Although acid treatment did not increase the adhesion of the ordinary acrylic resins, adhesion obtained with the "Sevriton" mix was about double that obtained on untreated dentin.

The results of 24-hour dye penetration studies showed that the dentin covered by adhesive was not stained although the resin itself picked up dye. Perhaps the glycerophosphoric acid dimethacrylate is the effective bonding agent in the cavity seal. Preliminary histologic studies of the bonded area showed a pronounced alteration in the staining reactions of the dentin layers adjacent to the adhesive. This indicates that chemi-

cal reaction may have occurred between the organic matter of the dentin and the constituents of the cavity seal. If chemical combination could be demonstrated as a basis for the adhesion observed, it would represent a significant development in attempts to bond resin materials to tooth structure.

For untreated dentin surfaces, initial bond strengths of 28 kg. per square centimeter were reduced to 15 kg. per square centimeter after three months' water immersion. Initial values for acid-treated surfaces of 53 kg. per square centimeter were reduced to 28 kg. per square centimeter after five months' water immersion.

Eastman Dental Dispensary, Rochester, N. Y.

▼

Equipment

Ultrasonics in dentistry

(Obserwacje kliniczne nad wplywem ultradzwiekow w niektorych chorobach stomatologicznych)

M. Kobylanska, I. Leszczynska and A. Magas.
Czas.stomat. 9:597-607 Nov. 1956

Several articles have appeared in dental literature describing and praising the use of ultrasonics in dentistry. Many of these reports, however, are inaccurate or, at least, premature.

To present a more accurate account of the present status of ultrasonics in dentistry, the Dental Institute of the University of Poznan, Poland, has published a report dealing with the use of ultrasonics in the treatment of patients with various oral conditions.

Ultrasonic waves between 15,000 and 20,000 cycles per second were produced in a moderate-sized generator and used in the treatment of persistent postoperative pain (in nine instances); for trismus caused by a delayed eruption of third molars (in 17 instances), and for neuralgia due to involvement of the gasserian ganglion and the root and branches of the trigeminal nerve (in five instances).

A similar ultrasonic device was used for discerning dental foci in the oral cavity (in 64 instances), and for producing a speedier coagulation (in 16 instances).

In all those instances the result of treatment was satisfactory.

When periodontal disease was treated with ultrasonic waves, however, neither cure nor improvement was obtained.

After termination of the tests, the following conclusion was reached: Until there are more data available on successful treatment with ultrasonic rays, confirmed by professional and scientific reports, the dental profession should be hesitant to use ultrasonics in the treatment of oral or dental diseases.

The results, positive and negative, obtained at the Dental Institute of the University of Poznan were based on limited studies only, and are inconclusive.

Swiecickiego 4, Poznan, Poland

Electrodiagnosis in diseases of the pulp

(Electrodiagnosticul si valoarea lui in stomatologie)

I. M. Schneier and C. Itco. *Stomat.,Bucharest* 3:213-220 July-Sept. 1956

For centuries the dentist's diagnostic resources have consisted mainly of physical examination, palpation and percussion. With the introduction of the x-ray machine and dental roentgenograms, a definite step forward was made. Not only the detection of pathologic changes of bones but the making of preoperative diagnoses with a high degree of certainty is now possible.

In lesions of the soft tissue and in intraosseous conditions, however, pathologic changes still are difficult to evaluate in roentgenograms because in the initial stage they are minute. It is necessary, therefore, to employ additional diagnostic media such as biopsy and microscopy. In preoperative studies of a diseased pulp, these histologic and bacteriologic examinations frequently cannot be executed accurately. Dental pulp, because it is a soft tissue and particularly because of its relation to the surrounding bony investment, is extremely difficult to evaluate.

The staff of the Dental Clinic of the University of Bucharest investigated recently the reliability of electrodiagnosis in 68 patients afflicted with diseases of the pulp. Continuous electric current, generated by a storage battery with a tension of 500 volts and an intensity of 250 microamperes, was used. As a passive electrode, a frontal zinc plate with a neon signal light was applied which made it easy to control the current and to determine whether the current passed through the tooth structures.

In 30 instances, anatomicopathologic examinations had been made prior to electrodiagnosis. In the majority of instances, the findings were identical.

Further studies on electric pulp testing methods are necessary. The Romanian investigations have produced a standardized technic for the interpretation of electrodiagnostic findings. They also have demonstrated the importance of an immediate revision of the mechanical and electrical principles involved in the construction of the pulp testing instruments now available.

Medic Stomatolog, Podul Iloaiei, Romania

▼ Miscellaneous

Cleaning of syringes (Reinigung von Carpulen)

Reinhold Kankowsky. *Deut.zahnärztl.Zschr.* 11:1007 Sept. 1, 1956

Proper cleaning of dental syringes before sterilization cannot be neglected whether steam under pressure, dry heat, hot oil, boiling water or chemical solutions are used. Traces of blood, saliva and drugs, inside and outside the syringes, must be eliminated carefully.

Cleaning the customary syringes is comparatively easy. The desired effect is achieved by dipping in either dehydrated alcohol or ethyl alcohol.

It is more difficult, however, to clean special syringes to which glass cartridge ampules (carpules) containing anesthetics are attached. Chemical solutions such as formaldehyde or hexachlorophene should be drawn into the syringe and ampule, and then ejected after a few minutes. It will be necessary to repeat this procedure several times.

It is self-evident that cleaning of syringes, however efficient the disinfectant used, cannot replace sterilization.

Bischofstrasse 1, Homburg/Kassel, Germany

Central needle sterilization

Ingram W. Ogden. *M.Technicians Bul.* 8:10-14 Jan.-Feb. 1957

About 500 injections into the oral tissues of patients are given daily in the dental department of the U.S. Naval Training Center, Bainbridge, Md. In an effort to provide adequate sterilization of needles a method has been devised by the oral surgery section whereby all the needles used for injections are autoclaved.

After the injection, a small amount of the solution is left in the ampul and the needle is flushed. The needle and syringe are then scrubbed by brush with germicidal soap. The hub containing the needle is removed and the needle is inserted into an empty ampul, and these are placed in a container. The containers are collected and taken to the central sterilization room where the needles are examined for cleanliness and barbs. The needles are replaced in the empty ampuls and wrapped individually in gauze sponges. These are placed in groups of nine in a towel, and the towel is folded and placed in the autoclave for sterilization. After sterilization the packs are distributed to the offices.

Before an injection the towel is opened and a wrapped needle is removed; the gauze wrapping precludes contamination of the other needles. The towel is closed and replaced in a cabinet drawer. The gauze is removed from the needle, and it is placed on the previously sterilized syringe by screwing on the hub. The new ampul is wiped with an antiseptic solution and placed in the syringe. The empty ampul is removed immediately prior to the injection to expose the autoclaved needle.

U.S. Naval Training Center, Bainbridge, Md.

Orthodontics and pedodontics

▼

Orthodontics

A new alveolar base retractor

(Der Alveolar-Basis-Retraktor)

A. Hoeflmayer. *Zahnärztl.Praxis* 7:6
May 15, 1956

The patient, a 14 year old boy, had an extremely enlarged upper jaw extending sagittally and transversally.

In the upper jaw, the distance between the first bicuspid on the left side and the first bicuspid on the right side was +8 mm.; the distance between the first molar on the left and the first molar on the right was +8.5 mm.

In the lower jaw, the distance between the first bicuspid on the left side and the first bicuspid on the right side was +3 mm.; the distance between the first molar on the left and the first molar on the right was +4.5 mm.

The dimension of the lower jaw exceeded to a small extent only the figures designated as normal by Pont.

The normally sized and shaped upper teeth were unable to fill adequately the spaces in the alveolar bone. All incisors protruded slightly.

The smaller lower jaw was prognathic; its teeth, however, were positioned correctly in their alveoli without signs of protrusion.

The symptoms of an extreme overbite were remarkable; the lower incisors almost met the base of their opposing teeth. On the right side, a distal overbite was observable, with a discrepancy of about half the width of a bicuspid.

If the enlargement of the mandible (according to Pont's index) could be regarded as a slight individual variation, then the upper jaw presented such an increase in growth as to exceed greatly the figures designated as normal by Pont, and, therefore, could be considered as an anomaly rather than as an individual variation.

The disharmony between the jaws was especially evident in the patient's profile line. The pronounced tilting of the anterior teeth and the distortion of the alveolar base are characteristics of true protrusion.

In the case reported, all anterior teeth were positioned on an overdeveloped osseous base with a restricted labial tilting. A simple retrusion would not close the gaps between anterior teeth and bicuspids. With a space of about 8 mm. on both sides, customary orthodontic methods would not obtain an esthetically pleasing appearance. The face would remain flattened, and the lingual tilting would increase the bulge of the labial bone base, which should always be reduced rather than emphasized.

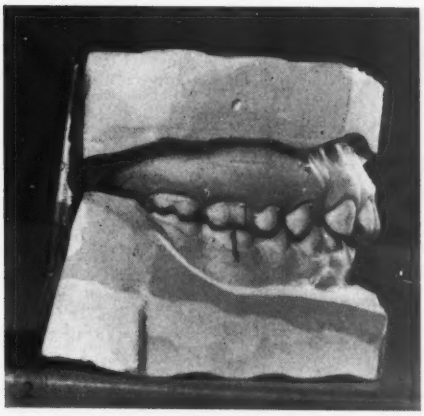
The retraction of the entire alveolar base was indicated. An alveolar base retractor was designed and constructed. Its method of function was similar to that of a chin cap. The apparatus consisted of an acrylic cap which was placed on the alveolar ridge above the anterior teeth. Small hooks were attached to the retractor and fastened to the clasps of the bite plate. Elastic bands, stretched between the clasps, provided for activation of the appliance. These elastic bands sloped gently upward and backward and prevented downward movements. The clasps fastened to the incisors prevented slipping toward the roots.

Such alveolar base retractors may be constructed on models after application of tin foil (0.2 mm.), and can be worn without discomfort by the patients.

Maximilianstrasse 6, Munich, Germany

1 Models of upper and lower jaw
2 Lateral view of the models
3 Alveolar base retractor
4 Patient's profile line
5 Retractor before insertion

1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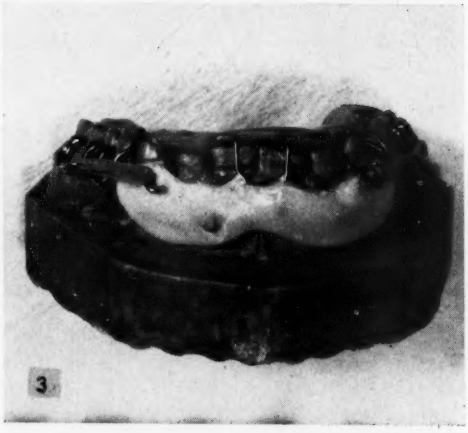
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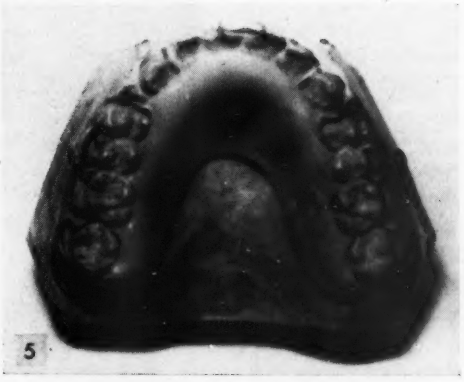
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An orthodontic band stretcher

C. C. Knowles. *D.Practitioner* 7:95-96 Dec. 1956

The author has designed an instrument (illustration, above) intended to overcome the occasional difficulty experienced in fitting a loop band where a little excess overlapping at the joint had rendered the band too tight. It was found that the fit of loop bands enlarged in this way invariably was superior to the fit of bands that had not required enlarging. This is because some contour is introduced into the band material by virtue of the shape of the heads (illustration, below) and because stretching the metal hardens it. A stretched band is less easily deformed and springs back more easily over the greater curvature of the tooth.

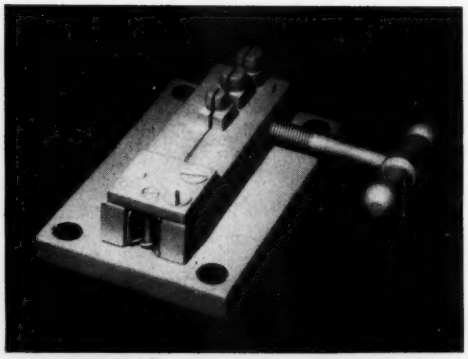
All molar and bicuspid bands used in the orthodontic department of the Liverpool Dental School now are made deliberately a little too small by increasing by about 0.5 mm. the amount of overlap at the seam at the time of welding.

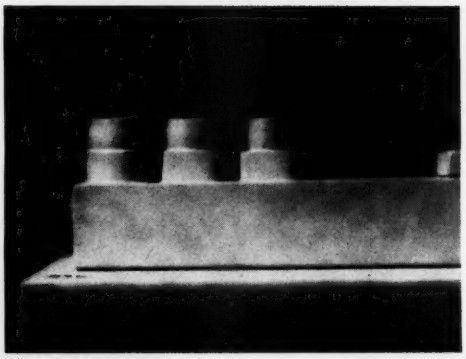
After the seam is welded, the distocervical margin of the band may be festooned before or after stretching, but before the band is placed on the tooth. This avoids undue damage to the distal gingival attachment when the tooth to be banded is the last molar of the series. The distocervical edge also is cut away sufficiently to prevent the band from projecting below the greatest diameter of the crown in this region.

As the greatest amount of stretching of the metal occurs opposite the gap between the heads as they are opened, care is taken to rotate the band on the head in between each movement of the screw so that a fresh length of metal is placed across the gap; this ensures that no part of the band is made unduly thin. The screw should be turned through about 20 degrees each time.

The instrument is made of steel, with the exception of the base and the top plate which are of brass. A stainless steel spring closes the jaws after use. The actuating screw is ¼ inch in diameter and carries a British Standard fine thread.

Liverpool Dental School, Liverpool, England





Illustration, above: General view of band stretcher. Below: Heads shaped to introduce some contour into the band during stretching

Orthodontic treatment for underprivileged children (Die Problematik der sozialen kieferorthopädischen Therapie)

Dorothea Neumann. *Fortschr.Kieferorthop.* 16:126-134 Aug. 1955

The term "social" orthodontics frequently appears in European dental literature. It is applied not only to the branch of dentistry which deals with prevention and correction of irregularities of teeth and jaws but to the orthodontic service rendered by considering the social, mainly the economic, circumstances of the patient or his family, and therefore, orthodontic treatment of underprivileged children. Later, perhaps, social orthdontics will treat all patients needing such a service.

Treatments under the auspices of social orthodontics are limited to instances in which favorable results may be expected with a high degree of certainty.

The following anomalies require social orthodontic treatment: (1) all types of malocclusion; (2) deflective occlusion; (3) crowding of anterior teeth; (4) excessive contraction of the jaws; (5) all forms of open bite, and (6) excessive overbite.

Patients older than 12 years are, at present, not included in the social orthodontic treatment plan.

The selection of child patients to be treated under this plan takes place during periodic school examinations, and should be based on the orthodontic investigation method as outlined by Kantorowicz and Korkhaus.

For underprivileged children, orthodontic treatment, often needed immediately, must be provided by the public health authorities. Prevention of caries by oral hygiene plays an important part.

Attempts to prevent malocclusion, although important, often are made too late. The first task of school dentists, therefore, should be to break persisting habits such as thumbsucking, tongue thrusting, lip biting, and so forth. The change of dentition from deciduous to permanent, and especially the occlusal positioning of erupted first permanent molars, must be watched carefully. The school dentist also should grind unfavorable planes on deciduous and permanent teeth.

Extractions for orthodontic purposes are more a compromise than a solution of the orthodontic problem. Such extractions are indicated only if immediate improvement of function or esthetic appearance can be obtained.

The employment of the often recommended extraction therapy, as well as the method of direction of tooth eruption by extractions, depends on the ability and experience of the dentist and on his mental attitude toward social orthodontics.

Koblenzer Strasse 104, Bonn, Germany

▼ Miscellaneous

Adverse muscle forces —their diagnostic significance

W. J. Tulley. *Am.J.Orthodont.* 42:801-814 Nov. 1956

The circumoral muscles originate as primitive elements forming the upper end of the alimentary canal and initially have to do with the vegetative function of feeding. The basic pattern of their behavior becomes established before birth. As the child matures, learned activities (for example, speech and facial expression) which are represented in the conscious levels of the mind become superimposed on this vegetative role of the orofacial muscles, although built on the basic underlying coordinating pattern.

It is necessary to distinguish between faulty muscular habits which can be eliminated with treatment and exercise, and the more innate behavior which may resist change. It is this subtle difference which is so important in assessing the stability of teeth that have been repositioned by the orthodontist. In some patients the underlying abnormal structure and behavior of the lower lip and tongue may be primary and not secondary to the malocclusion, and may tend to produce deterioration of the incisor relationship after orthodontic treatment. It is important to distinguish between a "mentalis habit" which can be eliminated and a particular pattern of lip structure and function which is part of the individual's physical make-up. Such lip positions are not habits, as they resist re-educational attempts and

make it impossible to change permanently the axial inclinations of the lower incisors.

Gwynne-Evans and the author are conducting a serial study of treated and untreated patients with the use of cinefilm. The film illustrates three main factors: (1) muscular habits that can be eliminated; (2) modification in behavior with growth and maturation, with special reference to swallowing, and (3) fundamental patterns that are unchangeable in both morphology and function.

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Present condition of orthodontics in Japan

Hirosi Iwagaki. *Am.J.Orthodont.* 42:914-920 Dec. 1956

There exist no great differences between the dental schools of Japan and of the United States in regard to the number of hours per year of lectures on subjects bearing on orthodontics, the hours of laboratory training and the hours allotted to clinical training.

Practically all dental colleges in Japan allocate from 40 to 60 hours to lectures on the following subjects: history, significance, aims and effect of orthodontics; growth and development; forces of occlusion; cause of malocclusion; classification of malocclusion and diagnosis; orthodontic appliances; tissue response; timing of treatment; physiology of muscle and myofunctional therapy; treatment planning and prognosis, and prevention of malocclusion. The average total hours of lectures in both countries are about 50.

Dental colleges in Japan allocate an average of 58 hours (compared with about 60 hours on an average in the United States) to the following subjects of laboratory training: orthodontic impressions and casts; wire bending and freehand soldering technic; lingual arch; labial arch; pin and tube appliance; Norwegian system of orthodontic treatment; orthodontic plate, and retainer.

In Japan, clinical training is adopted as a part of the regular course in all colleges, without exception; the average time allotted is 70 hours.

Whereas in the United States, the administrative policy of each college seems to be eminently individualistic, in Japan practically all dental colleges adopt substantially the same pattern.

Although the dental colleges in Japan probably are not inferior to those in the United States so far as the number of patients treated orthodontically and the quality of orthodontic treatment are concerned, the quality of orthodontics practiced by dentists in Japan is unsatisfactory.

Whereas in the United States about 3 per cent of dental practitioners are recognized specialists in orthodontics, in Japan there are only one or two orthodontic specialists; when there are included those who made a special study of orthodontics in college and who have since performed orthodontic procedures while working as general practitioners, the number does not exceed between 50 and 100.

A questionnaire circulated among a sampling of 500 Japanese dentists reveals that difficult orthodontic conditions are left unattended (especially in rural districts), and that the practitioners who state that they give orthodontic treatment "for actual profit" are in a small minority. The majority of practitioners state that they give orthodontic treatment "for my interest" or "for my study." Orthodontic practice in Japan yields no adequate financial return.

The Japan Dental Association recently has organized a committee to establish the specialist system. Seven Japanese dental colleges and one private laboratory conduct orthodontic research. Some of the Japanese research studies compare favorably with those in Europe or America, but unfortunately all are written in the Japanese language and published in Japanese periodicals.

The Japan Orthodontic Society is a component of the International Orthodontic Congress; since 1932 it has published *The Journal of Japan Orthodontic Society.* There also exist the Tokyo Orthodontic Society and the West Japan Orthodontic Society.

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Periodontics and endodontics

▼

Endodontics

Failure in conservative treatment of a carious molar

(Erfolglose konservierende Behandlung eines unteren Molaren)

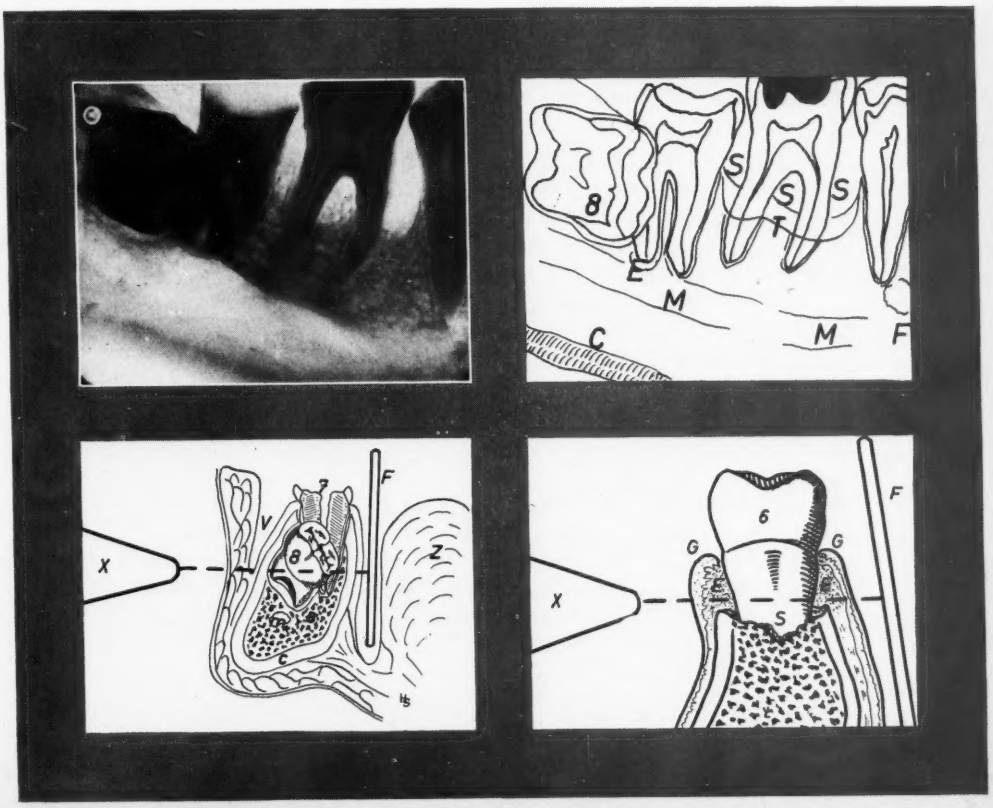
H. Schwarzkopf. *Zahnärztl.Reform* 57:23 Jan. 1956

After root canal treatment, the carious left second molar of a 39 year old woman had been treated with iontophoresis. The tooth remained vital, free from pain and the therapy seemed to be successful. A few weeks later, however, the symptoms of an apical periodontitis appeared. The root canals had to be reopened. The roentgenogram revealed neither inflammation of the periodontium nor focal infection of the root apex but an impacted third molar. Does it seem possible that a relation exists between the presence of an impacted tooth and the failure in conservative treatment?

The roentgenographic observations were clear (illustration, above left). In the diagram (illustration, above right), the assumed center of the focal infection lies at point E. The impacted third molar (8) is not completely developed, and its crown is situated lingually behind the distal root of the second molar. Severe decomposition of the alveolar bone between the first and the second molar (S and T) is visible. C designates the compact part of the mandibular bone, and F the mental foramen.

The illustration, below left, reveals the position of the impacted third molar (8). V designates

Illustration, above left: First and second molars and impacted third molar. Above right: Diagram of all three molars. Below left: Diagram of impacted third molar. Below right: Diagram of first molar



the oral vestibule; X the central beam of the roentgen rays; C the compact part of the mandibular bone; 7 the carious second molar; Z the tongue, and F the plane of the x-ray film.

The illustration, below right, shows the position of the first molar (6). E designates the center of a possible focal infection; X the center of the roentgen rays; G the interdental papillae; S the decomposed osseous structure, and F the plane of the x-ray film.

Correct evaluation of roentgenograms is necessary for diagnosis and treatment planning. The only treatment indicated, therefore, was an immediate extraction of the impacted third molar.

The failure of the conservative treatment (root canal therapy and iontophoresis) could have been avoided by a correct evaluation of the patient's past history and by taking roentgenograms before beginning the conservative treatment.

Weissekreuzstrasse 6, Hanover, Germany

Comparison between root canal cleansing with sulfuric acid and cetyl pyrimidinium chloride (Biosept)
(En klinisk och röentgenologisk jamforande studie över rotkanalrensning med svavelsyra och med biosept)

L.Z.Strindberg. *Svensk tandläk.Tskr.* 49:373-386 Aug. 1956

The Callahan-Johnson method for cleansing root canals includes the use of sulfuric acid followed by sodium bicarbonate for neutralization. The necrotizing effect of the acid on the periapical tissue, together with its detrimental effect on root canal instruments, made a re-evaluation of the usefulness of the method important.

Fifty-five teeth with 83 roots were treated according to the Callahan-Johnson method, and 55 teeth with 85 roots were treated with the nontoxic, bactericidal quaternary ammonium compound, cetyl pyrimidinium chloride (Biosept). The teeth were taken at random, and instances with and without periapical rarefactions were present in both groups. The identical mechanical technic was used in all instances.

A comparison was made between the capacity of the solutions to make the canal accessible to instrumentation, as judged by clinical and roentgenographic observations, the time consumption, and the immediate clinical effect. The latter was measured by the frequency of pronounced exacerbations in relation to the treatment.

No significant difference was observed between the cleansing effect of the sulfuric acid and the cetyl pyrimidinium chloride. Nor did the sulfuric acid facilitate widening of the canals more than did the cetyl pyrimidinium chloride. The risk of exacerbations appeared to be equal for the two methods.

It appeared that the treatment with sulfuric acid did not have any advantages over that with cetyl pyrimidinium chloride. Because of the contraindications to the use of sulfuric acid, it is recommended that its use be discontinued.

Tandläkarhögskolan, Stockholm, Sweden

A stereomicroscopic study of the root apices of 400 maxillary and mandibular anterior teeth

David Green. *Oral Surg., Oral Med. & Oral Path.* 9:1224-1232 Nov. 1956

This study of 400 anterior teeth is a continuation of the author's previous research dealing with the root apexes of 100 mandibular molars. A study of the apical regions of teeth is important, inasmuch as it involves the gateway of the circulatory and nervous systems of teeth.

The 400 teeth were collected at random from the offices of general practitioners and oral surgeons and from dental clinics. They were obtained from patients of all ages, presumably the ages of the patients ranging from above 40 years.

Of the 400 anterior teeth examined, between 10 and 12 per cent had one or more accessory foramens. Most had only one accessory foramen.

The average diameter of the major foramens of 150 maxillary teeth was 0.4 mm. The average diameter of the major foramens of 250 mandibular teeth was 0.3 mm. The average diameter of the accessory foramens of all the 400 anterior teeth was 0.2 mm.

The average distance of all major foramens (excluding the mandibular incisors) from their apexes was 0.3 mm.; that of the mandibular in-

cisors, 0.2 mm. The average distance of all accessory foramens from their apexes ranged from 1.0 to 2.2 mm.

Of the three main contours of the apical foramens, the round type ranged from 58 to 78 per cent; the balance up to 100 per cent were oval and asymmetrical. Serrated peripheries ranged from 14 to 21 per cent, and pronounced funneling ranged from 18 to 46 per cent. Foramens observed directly on the apex ranged from 22 to 46 per cent.

Of 150 maxillary anterior teeth examined, all roots contained single canals. Of the 200 mandibular incisors examined, 40 contained two major canals. Of these 40, 26 had two foramens exiting from the apex and the remainder had one major foramen. Of the 14 incisors with one foramen, eight had one calcified canal and six had coalescing canals.

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Periodontics

Bacteria and gingivitis

Stig D. Schultz-Haudt.

Norske Tannlaegeforen.Tid. 66:203-209
April 1956

Certain types of gingivitis, particularly Vincent's gingivitis, are associated with bacteria. In chronic marginal gingivitis, however, there is a considerable disagreement among authors as to the role of bacteria.

Miller stated: "Periodontal disease is not caused by bacterial infection." Rosebury, on the other hand, reported on the basis of his careful studies: "These findings seem to demonstrate that bacterial infection is an indispensable aspect of periodontal disease."

The following evidence points to gingival bacteria as being of primary importance in the initiation of periodontitis and gingivitis:

1. Poor oral hygiene with an accumulation of gingival deposits containing bacteria usually is accompanied by gingivitis, and only after removal of these deposits does the gingiva return to normal health.

2. In local conditions, such as overhanging fillings or inlays, malposition of the teeth or anatomic peculiarities, accumulations of debris occur between and around the teeth, resulting in gingivitis.

3. The ready response of gingivitis to antibiotic treatment suggests that infection plays an important part.

4. The progressive, transmissible lesions, often observed in gingivitis, have many of the characteristics of a periodontal infection, and can be produced artificially by injections of gingival scrapings in experimental animals (Rosebury).

5. Many unsuccessful attempts to induce periodontal disease in germfree animals known to be highly susceptible to periodontitis and gingivitis when reared under ordinary conditions have been reported.

6. Pure cultures of certain pathogenic bacteria introduced into healthy gingival crevices of dogs with clinically normal gingivae have resulted in necrosis of the pocket epithelium and severe inflammation of the connective tissue (Waerhaug and Steen).

The term "gingivitis" designates the presence of an inflammatory process in gingival tissues. Enzymes apparently do not cause an inflammatory reaction after injection into intact tissues. Hydrolysis of intercellular substances, however, aggravates the tissues sufficiently to account for a part of the inflammatory reaction, for example, an increased capillary permeability. There may be additional "toxic" enzymes present which can induce inflammation. Some evidence, at least, points to the presence in gingival deposits of substances that are toxic to tissues.

In determining the relation that exists between bacteria and gingivitis, the possibility must be considered that gingivitis also may be developed, caused or influenced by hypersensitive reactions in gingival tissues. Little experimental work, however, has been carried out in relation to this problem, and almost the entire research field still is "wide open."

Too little precise knowledge has been obtained to determine and evaluate the role of bacteria in chronic marginal gingivitis.

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Treatment of the periodontal diseases

W. G. Cross. *M.Press* 236:198-201 Aug. 29, 1956

The oral tissues react in response to injury exactly as do other comparable tissues in the body, but these reactions are modified by general tissue changes, as in certain endocrine or deficiency diseases, and also by the local environment; by the proneness of the teeth, in the absence of suitable oral hygiene or detergent foods, to accumulate sticky debris in which decalcification takes place, and by the strains and stresses occasioned during occlusion. Such strains and stresses may result from either masticatory or nonmasticatory movements of the mandible.

Nonmasticatory movements of the mandible are largely involuntary and consist of two main kinds: swallowing, and grinding or clenching of the teeth. Bruxism is particularly prevalent in patients with periodontal disease. It is thought to be due to two main causes—psychological, and local irritation. Bruxism caused by domestic difficulties, financial worries or heavy responsibilities is encountered rarely in the laborer, relatively often in the intellectual or professional. Local causes of bruxism may consist of overerupted teeth, malplaced teeth, premature contacts, teeth with chronic abscesses or deep pockets and teeth which have migrated from their former position. When the patient clenches or grinds such teeth, he often obtains some relief from the discomfort he has been experiencing. The damage which may be done to the supporting tissues by nonmasticatory movements far exceeds that occasioned by mastication.

The two main objectives of periodontal treatment are the establishment of a clean and readily cleansable mouth and the establishment of a well-balanced functional occlusion.

For acute ulcerative gingivitis, appropriate antibiotics are invaluable. Both antiseptics and astringents are used principally as mouthwashes or for local medication of the gingival crevice or pocket. Antiseptic mouthwashes render an unpleasant mouth temporarily somewhat less unpleasant, but the effect is transient. Topical astringents when used in conjunction with scaling are useful in reducing edema.

If the dentist believes that calculus is the most frequently encountered local irritant in the mouth, he must concentrate his efforts on the prevention of its formation and, where this fails, its removal.

No substance capable of dissolving calculus, yet free of harmful action on the teeth, has been found. Experience, patience and really sharp, sufficiently small instruments are needed for subgingival scaling. Where pocket formation extends 6 mm. deep or more, gingivectomy is utilized; the gum margins and interdental papillae are excised to the base of the pocket, and the alveolar margin may be trimmed to a more suitable architectural form. Flap operations and bone grafting may be performed.

After such procedures, a rigorous regime of oral hygiene must be instituted. The patient must be taught correct methods of toothbrushing and the use of interdental stimulators if necessary, and how to recognize when the teeth are clean.

An unsatisfactory occlusion may be corrected by orthodontic means, restorations of crowns and onlays, partial prostheses and selective grinding. Systemic treatment may include endocrine and vitamin therapy.

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The periodontium in diabetes mellitus
(Das Paradentium bei Diabetes mellitus)

Paul Heyden. *Deut.Zahn Mund Kieferhk.* 23:97-126 June and 202-220 July 1956

At the department for conservational dentistry of the West German Dental Clinic of Düsseldorf, pathologic alterations occurring in gingiva, periodontal membrane and alveolar bone in patients afflicted with diabetes mellitus have been examined clinically, histologically and roentgenographically.

The results support the hypothesis that diabetes mellitus has a definite influence on structural changes appearing in the periodontium. The use of the terms "diabetic periodontal inflammation" and "diabetic loosening of teeth" seems justified.

Diabetes mellitus is characterized by the failure of the tissues of the body to oxidize carbohydrate at a normal rate due to a lack of "available" insulin produced by the pancreas, especially by the islets of Langerhans. The pathologic changes

in the cell metabolism are morphologically difficult to determine. In the periodontium they depend on individual tissue reactions that vary according to the patient's age, condition and nutrition.

Important for the extent of periodontal changes are (1) the patient's age, and (2) the duration of the existent diabetes mellitus.

A great susceptibility to diabetic periodontal inflammation exists in the gingiva.

In patients of an older age, it is difficult to establish relations between diabetes mellitus and periodontal disease because other causative factors predominate.

During the examinations carried out at Düsseldorf, in no instance were deposits of cholesterol observed in periodontal tissue. Glycogen deposits were found, but it is too early to speak of a definite correlation between diabetes mellitus and glycogen deposits in the epithelium of the periodontium.

In younger persons, no arteriosclerotic changes in periodontal tissue were observed. When such changes were observed in older patients, it was difficult to differentiate between senile phenomena and sequelae of diabetes mellitus.

Uhlandstrasse 54, Düsseldorf, Germany

Tooth extraction and fixation in periodontal disease (L'extraction dentaire et la fixation en parodontologie)

José Font. *Parodontol.,Zurich* 10:118-124 Sept. 1956

A combination of several factors, dysfunctional, irritational and systemic, produce periodontal disease in various forms and degrees.

Recent research and new treatment methods have made the disease curable. Loose teeth can be tightened, periodontal pockets eradicated and gingival tissue returned to firm consistency and normal color. Discomfort during masticatory function can be reduced and eliminated, and teeth which cannot be preserved can be replaced with prostheses.

Conservative treatment of periodontal disease if the condition is complicated often does not obtain the desired result, especially when fixation requiring devitalization has been attempted.

In such instances, the treatment method recommended consists of a combination of oral surgery and prosthetics (construction and insertion of fixed bridge units or fixed partial dentures). Prior to treatment, multiple tooth extraction must be performed, and only teeth serving as abutments should be preserved. These abutment teeth, mainly cuspids, second bicuspids and second molars, should be provided with full or three-quarter crowns. The bridges, either two or three in number, serve as splints. Splints are joined together by specially constructed transverse screws, thereby forming a single unit of maximum efficiency. The construction of sectioned bridge units is necessitated by the difficulty in obtaining conformity of occlusion.

The treatment is completed by gingivectomy in which all doubtful factors are eliminated, and by a temporary immobilization of the remaining teeth. In each remaining tooth, however, the relation existing between the supporting ability of its periodontium and the amount of stress it receives in function must be determined. Each tooth must be in such balance that the resultant forces of function are not able to tilt it and to cause either inflammatory reaction accompanied by susceptibility to new pocket formation or migration.

This method, involving both the periodontist and the prosthodontist, has achieved favorable results in the majority of instances.

Académie Royale de Medecine, Valencia, Spain

NUG: New name, old disease

Frederick J. Halik. *J.Oklahoma D.A.* 41:34-36 April 1956

Vincent's infection has paraded through history with many different names. Necrotizing ulcerative gingivitis is the recognized scientific name; it can be abbreviated as NUG.

The classical signs and symptoms have not changed for centuries. They are inflammation necrosis, sloughing, ulceration and fetor oris.

Bibby (1953), reviewing bacteriologic information, indicated that four organisms—spirochetes, fusiforms, vibrios and cocci—are synergis-

tically involved in the process, but only together with "some tissue component or metabolite of tissues or bacteria growing in the tissue."

Debilitation of the individual is a prime factor in the etiology. Dietary deficiencies, worry, overwork, illness, endocrine imbalance or indeed anything that tends to lower the physiologic health of gingival tissue can produce necrotizing ulcerative gingivitis. Psychogenic influences are invariably important. The disease is not communicable.

The interdental papillae are almost always affected, and their loss gives the gingiva its characteristic gnawed-out appearance. Treatment must include eradication of the craters and reformation of the interdental papillae.

The acute stage is easily controllable. Antibiotic therapy should be systemic and reserved for the debilitated, severely sick, febrile patient.

Subgingival curettage in the affected regions brings immediate relief of the acute symptoms. The most effective treatment involves removal of subgingival irritants by the use of curets, relief of stasis by hemorrhage and mechanical débridement. Curettage followed by mechanical rinsing with 3 per cent hydrogen peroxide mixed half with water will produce the most favorable result.

The reshaping of the gingival tissue is in essence a gingivoplastic operation. Coarse diamond stones or a periodontal knife with a contra-angle blade may be used.

708 Temple Building, Rochester, N.Y.

Diseases of the mouth caused by the herpes simplex virus

E.D. Farmer. *Proc.Roy.Soc.Med.* 49:640-646 Sept. 1956

Of 54 patients with acute herpetic stomatitis examined during the past three years, 36 were between the ages of 16 and 46 and 16 were under 10 years of age. The incidence was fairly evenly distributed between the sexes and seemed to be more prevalent between the months of September and May, with December as the peak month. Sixteen patients had a history of contact with recent "cold sores" or with mouth ulcers. Six had a previous history of "cold sores" and one of mouth ulcers.

Serological evidence indicates that in 12 out of 13 patients tested over 16 years of age, the infection was a primary herpetic infection. The herpes simplex virus was isolated from 21 out of 36 patients. Typical eosinophilic intranuclear inclusion bodies were found only between the fourth and seventh days of illness.

In the adult, the first symptoms may include soreness or pain in the mouth and throat, bleeding, swollen and painful gingivae, discomfort on swallowing, enlarged and tender submaxillary glands and general malaise. Two or three days after the onset of symptoms small rounded vesicles appear anywhere on the oral mucosa, tongue and lips. The vesicles may be well filled but more usually have a slightly raised crinkly greyish-white covering which is easily removed. The vesicles rapidly break down to form small shallow saucer-like ulcers with reddened margins. They may be discrete or confluent and when confluent the resulting ulcer is irregular in outline. Similar lesions appear on the tongue, palate and pharyngeal mucosa. As on the lips and buccal mucosa these usually are larger than on the gingivae and attached mucosa. The lips usually are dry and scaly and often show large crusted lesions. Lesions on the white skin of the face were seen only in two of the patients over 16 years old.

It is doubtful whether there is any relationship between the recurrent ulcers experienced after acute herpetic stomatitis and the common, and possibly nonspecific, recurrent aphthous ulcers.

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Ovarian function in periodontosis

Roslyn Wiener, Maxwell Karshan and Benjamin Tenenbaum. *J.D.Res.* 35:875-878 Dec. 1956

Because periodontosis occurs predominately in women of reproductive age, particularly during adolescence and early maturity, it was thought that a study of ovarian function in women with periodontosis might yield an etiologic clue. Thirty-three women between the ages of 14 and 43, all patients with periodontosis, were studied

to ascertain the quality of ovarian activity. The indices employed were serial vaginal smears, simultaneous oral smears (in 16 patients) and basal body temperature records.

Of the 33 subjects studied by vaginal smears, alone or in conjunction with oral smears and by temperature records, 19 showed ovulatory cycles of good quality, 8 of fair quality and 3 of poor quality. Three patients with anovulatory cycles showed evidence of moderate to pronounced estrogen deficiency.

Some correspondence was observed between the severity of periodontal disease and the quality of the ovarian cycle, with 15 of the 19 subjects demonstrating ovarian cycles of good quality showing only slight or moderate periodontal involvement. In the remaining 14 subjects, slight and moderate involvement was noted in six. Stated differently, there were four severe instances in the group of 19 with good ovarian cycles and eight severe instances in the group of 14 showing fair, poor and anovulatory cycles. All three patients with anovulatory cycles showed severe involvement.

Of the 16 patients in whom simultaneously obtained vaginal and oral smears were studied, 11 showed good correspondence between the series. Five patients showed no correspondence. Two patients with moderate to severe periodontal disease showed fair to good vaginal cycles.

No distinctive oral smear picture of periodontosis emerged, though the observed "sheeting" may be related to local gingival involvement.

School of Dental and Oral Surgery, Columbia University, New York, N.Y.

Classification of periodontal diseases with etiological factors

John Oppie McCall. *New York D.J.* 22:431-441 Nov. 1956

A classification of periodontal disease which is consonant with pathologic findings is proposed, with a related list of the principal etiologic factors. The basic pathologic division is first indicated, then the periodontal tissue chiefly involved, the type of pathologic disturbance in that tissue, and the principal etiologic factors.

Periodontal diseases are divided first into primary and secondary conditions. Primary diseases are those which originate in the periodontium, especially in the periodontal portal of entry (a tissue complex comprising the marginal gingiva, the attached gingiva and the alveolar crest). Secondary diseases are those which originate outside this region and attack the periodontium secondarily. Subdivisions are set up for each group.

In the primary disease group, subdivisions have been set up under these headings: productive, destructive and degenerative. In the secondary group the subdivisions are set up with the emphasis on the kind of disease or abnormal agency which has produced the periodontal disturbance.

The classification is criticized by the following consultants: Joseph L. Bernier, Irving Glickman, Donald A. Kerr, Arthur H. Merritt and Samuel Charles Miller.

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Professional activities

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Miscellaneous

The fine arts and dentistry [Part I]

(A propos des quelques aspects stomatologiques dans les beaux-arts)

Imre Szekély. *Actual.odontostomat.,Paris* 10:411-429 Sept. 1956

In any attempt to arrive at a clear and comprehensive definition of the term "art" it is necessary to disregard all philologic and etymologic derivations which, in the past, have led to confusion.

In a modern and more restricted sense, the term art should be applied only to those human activities which tend toward esthetics. In a figurative sense, however, one may speak of medical or dental art, art of cooking, art of warfare or art of living. Medicine, dentistry, cooking, warfare or living, however, cannot be included in the list of true arts.

Art, today, consists of the "fine arts" such as architecture, sculpture and painting with their subdivisions, and "dynamic arts" such as music, poetry and the drama with their subdivisions.

Many painters and sculptors have emphasized the mood of their figures by extensive distortions of the lips, chin and teeth. Other artists have selected distinctly dental topics.

When dentists or dental students visit museums or art galleries they often can observe that in paintings and sculpture, especially when human figures are depicted with parted lips, anatomical misrepresentations of the mouth, lips, jaws, teeth and oral structures occur. It will not always be clear to the observer whether these incorrect representations were done intentionally or unconsciously by the artist. Similar or more severe errors in the representation of oral structures have crept into anatomical drawings done by famous artists or scientists.

The Flemish masters, Adrian Brouwer, Frans Hals, Jan and Pieter Breughel and both David Teniers (father and son) often depicted dentists or dental charlatans performing tooth extractions. The Dutch painter, Johan Lingelbach, portrayed an Italian dental charlatan on horseback extracting a molar.

Some of the paintings of the eighteenth century have specific dental interest.

L. K. Wellner's drawing, "Head of a Girl," shows a dentition in which the lateral incisors obviously are larger than the central incisors, an error which was duplicated by Sandro Botticelli in his painting "French Woman."

In the anatomical study, "Head of a Man," by I. Stein, all teeth have the form and shape of central incisors. The same misrepresentation appeared in the ancient Greek sculpture, "Head of the Gorgon Medusa," in the Aztec mosaic "Turquoise Mask," and in an anatomical drawing by Professor A. Froriep, "Skull of a Man." In this anatomical drawing, designed for medical students taking courses in anatomy, all teeth, especially the molars, are in an impossible occlusion. A similar misrepresentation can be observed in the mask adorning an Aztec pitcher. [To be concluded in the July issue]

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1 "Head of a Girl" by L. K. Wellner
2 "French Woman" by Sandro Botticelli
3 "Head of a Man" by I. Stein
4 "Head of the Gorgon Medusa" (Greek, 560 B.C.)
5 Turquoise mask (Aztec mosaic, about 1400 A.D.)
6 "Skull of a Man" by A. Froriep
7 Mask (Aztec pitcher, about 1400 A.D.)

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Gautama Buddha's left upper cuspid
(Buddhas linker oberer Augenzahn)

E. Heinrich. *Deut.Zahnärztebl.* 10:693
Sept. 8, 1956

In the main temple of Kandy, a city in the central region of the island of Ceylon, most of the sacred relics of Gautama Buddha are preserved and treasured.

Among these sacred objects, the "genuine" left upper cuspid of Buddha is especially esteemed and venerated by millions of faithful Buddhists.

What would the city of Kandy be without Buddha's tooth? This city with a population of only 50,000 is visited yearly by more than 1,000,000 pilgrims who come from all parts of the globe to Ceylon to see Buddha's tooth because no other fragment of his skeleton remains.

When the Portuguese conquered Ceylon in 1517, the tooth of Buddha was kept in its holy shrine. The archbishop of Goa abhorred the pagan cult of praying to a tooth, and according to Portuguese historians, this heathenish idol was destroyed by flames as ordered by the archbishop.

After the Dutch dislodged the Portuguese in Ceylon in 1638, Buddha's tooth, however, reappeared in its shrine. The Ceylonese believed—and still believe—that a miracle had taken place. Buddhist priests and historians claim the genuine tooth was removed and hidden before the archbishop's edict, and that the tooth of a slain Portuguese soldier had been burned.

Buddha's left upper cuspid and its special cult survived the Dutch regime, the British occupation (1795-96) and the imprisonment and expulsion of the last king of Kandy (1815).

Now, once a year, in a sacred procession to celebrate Buddha's ascension, the tooth is exhibited on the back of a red and yellow painted elephant. More than 100,000 pilgrims from other cities of Ceylon, from India, Burma, Tibet, Japan and China follow this procession and strew flowers and burn incense.

On the other days of the year, Buddha's tooth is kept behind three golden capsules, closed with three golden locks in its sacred "Karanduwa," a shrine made of gold and silver. The shrine, covered with emeralds, rubies, sapphires and pearls, stands on an altar and is guarded by Buddhist priests. The three locks can only be opened with three golden keys which are in the possession of three different high priests.

Smaller temples have replicas of Buddha's tooth. Corresponding to the extraordinary stature, strength and power of Gautama Buddha, his cuspid appears to be at least two inches long and one half inch wide, and it is "as beautiful and powerful as the wild boar's tusk" (Tipitika, 100 B.C., quoted by Katz, 1954).

The dentist and the public

Claire Danziger. *J.New Jersey D.Soc.* 27:28-31
July 1956

Public relations means relations with the public. The public's attitude is an essential concern to most elements in society today.

In contesting for the public's favor, the dental profession has a vast advantage in that it is providing an essental health service in the genuine interest of the public. The dental profession in the United States occupies a position of public esteem unsurpassed by that of any other country.

The growing stature and prestige of dentistry has been made possible because the majority of dentists have done an outstanding job individually. The public attitude toward any professional group is formed to a large extent by the impressions people receive from individual members of the profession. Relations with patients, the quality of service, efficiency of appointment schedules, the conduct of auxiliary personnel and the advance discussion of fees all contribute substantially to dentistry's public relations.

The dentist's impact on a community comes largely through another source, his component and constituent societies. Here, the public relations picture is a matter of doing a good job and letting the public know about it.

Concrete steps toward good public relations that may be taken by a dental society include the following: establishing a grievance committee; taking a leading role in Community Chest or Red Cross campaigns; establishing a referral system; working out a practical program for the care of the indigent; maintaining liaison with physicians and other allied professional groups; alerting the

public to the health threat of illegally operating dental laboratories; establishing a sound dental health education program, and sending representatives to speak before local service clubs or parent and teacher groups.

Publicity is only a tool. Before there is any thought of publicity there must be a policy and a program, soundly conceived, understood and widely approved by an informed society. Good public relations is simply a matter of good common sense plus the willingness to work at it.

The professional man's extra income tax burden

Milton R. Culbert. *J.Canad.D.A.* 23:11-14 Jan. 1957

A comparison between a professional society and a trade union reveals this important difference: The professional man devotes the major part of his time at his meetings to study of ways and means of improving his knowledge, skill and services; the trade unionist devotes his time at his meetings to study of ways and means of improving his income and his personal benefits. What are the results of this difference? The trade unionist has gained a position of high privilege and freedom from responsibility, with sick benefits, vacation with pay and pensions. Meanwhile, the professional man has seen those of lesser skills and lesser responsibilities leave him far behind in these fields.

Although the professional man is high on the income scale, he must pay much higher income taxes than people in industry earning comparable incomes, and he works much longer hours.

In Canada, the dentist begins his career with thousands of dollars worth of mental machinery which he can neither capitalize nor depreciate. He conditions himself to work long, tedious hours in a stance that would kill an ordinary workman, under tension that would wreck the average executive, and in quarters that would induce claustrophobia in many persons. As his own two hands earn his income, that income ceases the moment he gets sick, and his expenses carry on. At his death, the most valuable asset that he has, his good will, perishes with him.

The Canadian dentist earning the average income of under $8,000 a year may be compared with his businessman brother earning exactly the same amount. The brother can deduct his annual maximum pension plan payment of $1,500 from his taxable income; the dentist cannot. Not only does the dentist pay $300 extra on the nondeductible $1,500 but to buy into a pension plan to reach financial parity with his brother, he must earn an equivalent additional amount which would cost well over another $300 each year. The dentist is out $600 more than his businessman brother on this one item alone.

If the brother runs his own business, he has in addition an elastic expense account that permits him to charge off business promotion, business travel and many other business comforts. The dentist's expenses are restricted to his bare office overhead.

Dentists may deduct expenses for only two conventions annually. Teachers in professional colleges still cannot deduct the cost of attending meetings, nor can they deduct for tax purposes the cost of purchasing books that they must have to do their job.

These injustices continue to exist although the government has been bombarded for years with briefs and petitions from professional associations. What politicians will consider a petition which represents a few hundred professional men and their votes, against the interests of large organized groups which represent several hundred thousand votes, especially if those voters may soon seek paid health plans?

As a national health scheme may not be too far distant, the Canadian government has told dentists they must be prepared to look after more people to handle the job. But what political party, during the acute housing shortage, would have the ideals or the courage to tell the building tradesmen that they must work on Saturdays, or to tell the bricklayers that they must lay more than the minimum number of bricks per day?

In their idealism, the professions have been unaware of the need to arm themselves with bargaining power; the professions must so arm themselves. The smaller number of professional men is counterbalanced by their indispensable importance.

Toronto, Ontario, Canada

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Hospital dental service

A review of consultant dental services in two contiguous areas in the United Kingdom

D. S. Hayton-Williams and R. Thexton. *Brit.D.J.* 101:198-202 Sept. 18, 1956

Prior to 1948, hospital consultant dental services were almost nonexistent apart from those provided by the dental teaching hospitals. The need for dental consultant services may be determined from the experience gained by the authors in area dental consultant services in the early years of the National Health Service. Two contiguous areas discussed are Oxford and Swindon.

The Oxford area is predominantly agricultural and local trading, but 40 per cent is industrial. Dental patients on a waiting list enter the Churchill Hospital. All emergency patients enter the Radcliffe Infirmary. Patients with jaw fractures enter the accident service wards. Patients with such conditions as spreading infections from alveolar abscesses and postoperative hemorrhage are classified as surgical emergencies and are the clinical responsibility of the dental consultant.

A well-equipped dental department for consultant services is located in the Churchill Hospital. Seventy-five per cent of the patients referred to the dental consultant are from general dental practitioners and 25 per cent from the medical and surgical staff of United Oxford Hospitals.

The work with outpatients broadly is consultative, and no treatment is given which could be provided by the independent dental practitioner unless at his specific request. Orthodontic treatment is given only to those who have cleft lip and palate. The work with inpatients is also consultative, patients being referred from medical and other dental members of the staff. Treatment is limited to that bearing on the patient's medical condition. In this group are included emergencies such as jaw fractures, infections of bone and soft tissue, postoperative hemorrhage and patients admitted from the waiting list for dental beds.

The dental department for consultant dental services in the Churchill Hospital opened in May 1950. Outpatient attendance per year was as follows: 1950, 722; 1951, 2,001; 1952, 2,355; 1953, 1,998, and 1954, 2,226. In 1954, 483 new outpatients were seen; there were 250 emergency and urgent calls, 240 inpatient consultations, and 350 operations on the set lists (that is, not emergency).

The experience at Swindon, a predominantly rural area, was similar. Outpatient attendance per year was as follows: 1951, 1,881; 1952, 2,022; 1953, 1,851, and 1954, 1,833. In 1954, 551 cases were treated in Swindon.

Any group of hospitals which purports to provide a wide range of medical and surgical consultant services is incomplete without a dental consultant and the necessary working facilities for him.

Today there are 249 full-time and part-time dental consultants in the United Kingdom, working 941 sessions a week. If the number of weekly sessions were to be trebled, about 500 extra consultants would be required. If these are recruited over the next ten years, a recruitment rate of 50 dental consultants a year will be required, in addition to the recruitment of 8 consultants to replace retiring ones, or an average of 58 consultants a year.

Organization of a dental department in a general hospital

(Organización del servicio dental en un hospital general regional)

Celso Moreno Correa. *Odont. Chilena* 5:898-902 May-June 1956

Three years as head of the dental department of the Hospital San Juan de Dios, in Santiago, Chile, has allowed the author to plan what is necessary for a dental department in a general hospital which attends to all medical specialties, and practices both preventive and curative medicine.

The plan is based on dentistry's four aspects: prevention, cure, extraction and replacement.

Prevention is all-important in dental diseases, which afflict about 90 per cent of the population and constitute a social problem. Some countries

(U.S.A., Great Britain) have developed the dental hygienist whose duties are to educate the public and treat certain aspects of dental disease. Where schools do not undertake their training, the hospital must prepare its dental hygienists.

The dental duties of a general hospital are as follows:

1. Dental examination of all outpatients and inpatients. In the Hospital San Juan de Dios this meant 80,000 patients in 1955.

2. Attention to children of school age, especially in regard to preventive measures.

3. Emergency treatment, 24 hours of the day, given by dental residents similar to the medical interns. This would include initial treatment of fractures, drainage of abscesses, control of hemorrhage, and treatment of pericoronitis.

4. Preventive and curative duties which include prophylaxis, elimination of septic foci, restorations for caries, endodontics, apicectomies, extraction of impacted teeth, prosthetics, orthodontics and periodontics.

5. Maxillofacial surgery which includes hard and soft tissue major surgery and also surgery in the salivary glands, for which is advocated dental internships, to prepare specialists.

6. Roentgenology by men with knowledge of extradental problems.

7. Permanent consultations with other medical specialists, to aid the patients and orient the physicians. A frequent problem is the obstetric patient.

8. Beds for dental patients; as in a general hospital it is difficult to obtain beds when necessary.

The physical plant of an adequate dental department should include a reception room, business offices, units fully equipped to treat patients, roentgenology department, recovery rooms, prosthetic laboratory, closet for cleaning utensils, and rest rooms for staff and patients.

The dental department should be coordinated with the rest of the hospital. Every patient on arrival must go through a complete examination: weight, blood pressure, blood and urine tests, lung roentgenograms and a dental examination. This dental examination should take place when the patient arrives and at the same time that he is given the other tests and examinations.

The folder with the patient's clinical history should have a separate page for the dental examination, on which sheet will be recorded the progress of the dental treatment.

Hospitalized patients will be examined in their wards, but the necessary treatment should be given in the dental department. In a hospital for acute diseases, the average stay per patient is 12 days, which is insufficient for complete dental treatment. It is the physician's duty to urge the patient to return for dental treatment as an outpatient.

The appointment of the head of the dental department to the hospital board, and the presence of the dentists at the scientific meetings held in other departments, will favor consultations and further assert the value of dentistry.

Hospital San Juan de Dios, Santiago, Chile

▼ Industrial health plans

Preplacement dental examinations in industry

Ira Dow Beebe. *New York J.Den.* 26:338-340 Nov. 1956

Oral health for the most part has been overlooked in the field of industrial hygiene. In a 1951 compilation of dental care programs in industry, the Council on Dental Health of the American Dental Association found only 16 such programs which included preplacement examinations. Most preplacement physical examinations are cursory insofar as the oral cavity is concerned, being made if at all by the physician or nurse. Preplacement physical and dental examinations are important in that they warn the prospective employee of possible incapacitation.

An ideal dental and oral preplacement examination would consist of the following: complete intraoral roentgenograms; explorer and mouth mirror examination on dry, clean teeth with appropriate lighting; vitality tests; transillumination; examination of the gingiva, anomalies, occlusion and general condition; noting of any growths, patches on cheeks, alveolar epithelium, tongue, palate and glandular ducts, and recording of the history. The average time for such an examination is 20 minutes.

A preplacement dental examination should be followed up by periodic examinations. The plant dentist can utilize the occasion to further dental health education. The dental program can be adjusted to the size of the company. Small companies of up to 2,500 employees can combine and utilize the services of a central clinic, or arrange to have visiting dentists, or employ a mobile dental unit for a group of companies. The Bureau of Industrial Hygiene in Pennsylvania has developed several pilot programs to meet the needs of companies of various sizes.

A physician should give the general preplacement physical examination and a dentist should make the dental and oral examination. Careful records should be kept.

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▼ Ethics

The professional man as a citizen

Donald M. Fleming. *J.Canad.D.A.* 23:1-4 Jan. 1957

The professional man should have the following distinguishing characteristics:

1. He should have a sense of indebtedness to the public. It has probably cost the taxpayer over $20,000 to educate him for his profession.
2. He should have a respect for learning and science, and encourage their progress.
3. He must hold a high conception of his calling.
4. He must be motivated by a desire to help those who require the services which he is in a position to render. If making money is a man's chief life objective, he does not belong in a profession.
5. He must have a sense of interdependence with other members of his profession.
6. He must abide by the ethical standards of the profession.

The professional man is a man with a sense of responsibility—to the profession, to the patient and to the public.

Eglinton, Toronto, Canada

▼ Forensic dentistry

Malpractice: doctrine of res ipsa loquitur applicable to dentists

J.A.M.A. 162:138 Sept. 8, 1956

The plaintiff, suffering severe pain and swelling from a wisdom tooth, went to the defendant dentist for relief. The defendant took a roentgenogram, determined the position of the tooth, and extracted it. In the process the tooth shattered, but the defendant removed the splinters, packed the cavity with medicated gauze and gave the patient a sedative. For the next three days the plaintiff went back to the defendant and complained of much pain in the socket, which eventually spread to the arm. At the end of the third day, said the plaintiff, the defendant told him he did not want to fool with it any more and that he was through with the treatment. Three weeks later, the plaintiff went to another dentist, who took a roentgenogram and discovered a piece of the broken tooth, about the size of the head of a kitchen match, embedded in the jaw. The dentist removed the fragment, and the plaintiff recovered from his disability.

Before the trial court the defendant testified he had pursued the proper course and the customary practice for routine extractions. He testified: "If you break a root, most of the time you feel it or you hear it." He said he had not felt or heard any breaking of the patient's tooth. The trial court directed the verdict for the defendant on the grounds that no dentist testified that extracting a tooth, even where there is a swollen condition, was improper medical practice.

The court of appeals held that the fundamental fact was that the defendant dentist only partially extracted the plaintiff's tooth and left a fragment in the socket. He did not complete the operation. Although the sequence of events indicated something was wrong, the defendant callously abandoned his patient in a condition of suffering.

The defendant had an x-ray machine and had used it before the operation but had failed to use it afterward in diagnosing and attempting to

remedy the unsatisfactory condition that was so apparent. When another dentist used an x-ray apparatus, he discovered the fragment of tooth.

The judgment of the trial court in favor of the defendant dentist was reversed by the court of appeals of Kentucky.

The dentist's liability for indirect damages

(Haftung des Zahnarztes für mittelbare Schäden)

D. Herold. *Zahnärztl.Praxis* 7:9 Aug. 15, 1956

The civil laws in most civilized countries require that the dental practitioner shall possess at least that reasonable degree of skill ordinarily possessed by other dentists practicing in the same community or region. It is assumed that the dentist exercises his professional duties with good judgment, care and faith.

The relationship between dentist and patient is based on a contract, expressed or implied, according to which the dentist agrees to diagnose, operate on and treat the patient. Most malpractice suits are based on alleged violation of a civil right by the dentist's alleged breach of contract, and on negligence in the performance of his professional duties.

Therefore, the dentist is liable for direct damages to the patient resulting from the dental work.

According to the German civil law, however, he is not liable for indirect damages as follows: (1) to an employer whose employee misses important work as a consequence of alleged malpractice; (2) to a husband who misses earnings, wages or gains in consequence of alleged malpractice of the dentist who has treated his wife, and (3) to any indirectly damaged person, if the fault lies entirely or partially with the patient.

He is liable (again according to the German civil law) if his conduct can be construed as a violation of dental practice. Then, not only the patient but indirectly damaged persons, may claim reimbursement for losses sustained.

In instances in which established malpractice of the dentist has caused the death of the patient, the dentist is liable to indirectly damaged persons (heirs or relatives) for funeral and tombstone expenses, and for the maintenance of the grave. If the dead patient had had an obligation (by law) to support another person, the dentist is liable to pay an annuity until such person becomes able to work and earn, and sometimes for the entire life of such person (children, parents, grandchildren, grandparents, adopted or illegitimate children).

The fee agreed on for dental service, or the absence of such a fee, has no relation to the dentist's obligation which he assumes when he agrees to treat a patient. Many courts in different countries have ruled that even in instances in which dental service was rendered gratuitously, all legal responsibilities of the dentist are incurred and the nonpayment of fees (whether agreed to or not) does not lessen the obligation to exercise reasonable care, skill and diligence in the treatment of a patient.

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▼ Auxiliary groups

The methods by which job analyses are made and how the results are used in designing education programs

W. W. Demeritt. *D.Asst.* 26:15-17 Jan.-Feb. 1957

There is no general agreement among dentists, dental assistants and dental educators on answers to the following questions:

1. What is the dental assistant expected to know and what should she do about the dental office?
2. How much formal education or training is necessary for optimum service?
3. How many dental assistants does the dental profession require?
4. What characteristics are desirable in a dental assistant?
5. What range of compensation is agreeable and equitable to the dental assistant and the dentist?

To obtain rational answers to the above questions, a job analysis should be made. Adequate samples of opinions should be obtained from

dental assistants and from dentists in various sections of the country. A workship should be held to list the duties and responsibilities found in a modern dental practice, to evaluate the activities and list those which a dental assistant can accomplish legally and effectively, and to classify such activities with respect to their importance and priority of performance for the dental assistant.

Pilot study training programs now being developed by several dental schools will permit further job analysis.

When the dental profession realizes the practicability and economy of employing dental assistants, it will revise its thinking on the problem of how many additional dental schools are needed. The Armed Forces may revise their thinking on the quantity of dentists needed.

School of Dentistry, University of North Carolina, Chapel Hill, N. C.

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Education

Section on psychology established

Willard C. Fleming. *J.California D.A. & Nevada D.Soc.* 32:388 Sept.-Oct. 1956

In recognition of the growing interest in psychologic factors involved in dental treatment and education, a section on psychology has been established in the School of Dentistry at the University of California in San Francisco. It is believed to be the first section of this kind in a dental college.

Modern dentistry has reached the point where technical excellence is not sufficient. The dentist of today must be educated to regard his patient as a human being whose feelings, fears, values and attitudes represent as much a part of the dentist's responsibility as do the technical operations which the patient requires.

The school received a five year teaching grant of $71,079 from the United States Public Health Service to inaugurate this program. The pilot program is designed to develop teaching methods and materials which can be applied in other dental colleges, and to train teachers and researchers who can staff similar departments in other colleges.

The first two years of the program will be devoted to training a staff of interested dentists. The special training will require the equivalent of one full day each week for two academic years.

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Dentistry around the world

Dentistry as a medical profession
(La odontología profesión médica)

Editorial. *Temas. odont.* 6:1-3 April-June 1956

The School of Dentistry of the Universidad Nacional of Colombia was reorganized in 1946. The definition of dentistry ("odontology") given on that occasion and accepted by the Federación Odontólogica Colombiana read as follows:

"Dentistry is a medical and scientific profession that is concerned with the preservation of the health of the organs, anatomic structures and tissues of the oral cavity, especially the teeth and the periodontium. To accomplish this as well as the treatment of buccal diseases and the correction of oral or dental deformities, dentistry has its own procedures and technics. Dentistry developed from the same biologic principles and basic sciences as medicine. The two are closely related and have common ethics and aims. Dentistry can be considered a scientific medical profession if the dentist does not have an M.D. before he studies dentistry, or as a medical specialty if he has such a degree."

On the basis of this definition, dentistry in Colombia should be considered a scientific medical profession. Dental students in the Facultad de Odontología of the Universidad Nacional de Colombia study and have to pass examinations in all the basic studies that constitute the curriculum of students of medicine. Studies in the field of dentistry are as extensive and as intense as those in the field of medicine. The dental program is worked out on the basis of a thorough knowledge

of all basic medical subjects studied during the first two years of dental studies.

The modern dentist is competent also in the field of medicine. Colombian dentists are well prepared to go forward, as dentistry advances, either without an M.D., which is not required, or with an M.D. because they choose to have this degree. Attempts are being made in the School of Dentistry to make dentistry, which is now a scientific medical profession, a medical specialty. This would make it compulsory for dentists to have the M.D.

Apartado Nacional 269, Medillín, Colombia

▼ Dentistry in government

Social dentistry in Germany

E. Müller. *Internat.D.J.* 6:323-339 Sept. 1956

The term "social dentistry," known in Germany for about 40 years, implies public health measures to prevent and treat diseases of the teeth, mouth and jaws of the entire population. Social dentistry in Germany is based on social insurance and on dental care of the young. Social health insurance began in Germany in 1883 and helped dentistry to develop, because the insurance structure made a dental service available to almost the entire population. A 1917 law stipulated that conservative treatment was to form part of the dental service available under sickness insurance. The importance of dental care for military efficiency was recognized in World War I; many military dental centers were established, and millions of soldiers received dental treatment for the first time. After that war, dentistry developed rapidly. The number of dentists grew from 2,771 in 1910 to 8,051 in 1925, to 32,312 in 1955.

The Federation of Panel Dentists is responsible to the public for treating insured persons. In 1954 about 24,000 panel dentists received about 197 million German marks for obligatory services through the sickness insurance companies, and subsidies for prosthetic treatment amounted to an additional 108 million marks.

The dentist has no individual contract with the insurance company. The dental organization is responsible for the dental care of insured persons. The insured person is free to choose his dentist only from those admitted to give treatment. Not all dentists are entitled to treat insured persons.

There is no rigid scale of fees for dental services; the insurance companies generally pay a capitation fee, and only rarely do contracts provide fees for individual treatments. The scale of fees for dental treatment is antiquated and inadequate. There is no provision for the treatment of periodontal disease.

The highest authority of joint self-government between the federal organization of dentists and the corresponding organizations of sickness insurance is the Federal Board of Dentists and Sickness Insurances, established in 1955.

One of the large sickness insurance companies covers about 15 per cent of the total number of insured. In 1954, 24,000 dentists provided the following services to the 3,123,000 persons insured with this company: consultations, 343,831; extractions, 1,507,677; administrations of local anesthesia, 1,274,095; root treatments, 820,537; simple fillings, 5,424,862; treatment of diseases of the mouth and removal of calculus, 2,261,903; operations, 241,715; postoperative treatments, 599,981; roentgenologic treatment, 317,006; dental roentgenograms, 654,189, and extraoral roentgenograms, 25,115.

Steps are now being taken to extend the school dental service to include all those between the ages of 3 and 18 years. Efforts are also being made to establish dental departments in all hospitals.

Social health insurance was decisive for the development of dentistry in Germany. But its rigid structure and its collectivistic tendency restricted its development. Social dentistry in Germany does not march with the times. Man as an individual is neglected. The provision of too much social care undermines the sense of obligation and responsibility. Social dentistry will be meaningful only if the state provides conditions which make it possible for the individual to feel responsible for his own health, the health of his family and that of the community.

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Operative dentistry

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Inlays and fillings

Indication for and construction of hollow inlays (Indicazioni e technica di costruzione degli intarsi cavi)

A. Baratieri. *Rass.trim.odont.* 37:186-202 July-Sept. 1956

No technic in inlay construction is designed to be followed automatically. Even the best technic is no more than a tool in the hands of the operator, and its value is limited by the skill and experience of its user.

Inlays must be considered to be the most conservative dental restorations. Various difficulties may be encountered, however, when large and heavy inlays are necessary to fill extremely wide cavities or if extensive damage to tooth crowns requires repair. The comparatively large amount of cast metal of such inlays often leads to periodontitis.

A new inlay technic is suggested in which the advantages of inlays are utilized and the disadvantages avoided. The experience and results obtained with "hollow" inlays (shell inlays) prove that it is possible to decrease the weight of the inlay and to secure the proper contour without disturbing the equilibrium of the pulp.

Although the technic of preparing hollow inlays is still in the experimental stage, it is practical and useful because it offers a method of compensation for shrinkage, and it is simple in application and accurate in effect.

Obvious biologic considerations have led to the recognition that it is essential to preserve the vitality of the pulp and to avoid damage caused by an excessive weight and the thermal conductivity of a cast inlay inserted into an extremely wide cavity. Hollow inlays are not indicated for all types of carious cavities. It is evident, however, that a hollow inlay, with a thicker layer than usually applied, assures increased stability and retention in large cavities and permits the wall surfaces to be prepared twice as wide. The possibility of a coronal fracture is reduced in comparison with compact inlays which frequently increase the functional load.

At the Dental Clinic of the University of Pavia, Italy, Zerosi and the author have studied the advantages and disadvantages of the hollow inlay technic which had been introduced and described by Steiger.

Hollow inlays are specially indicated for nonvital teeth. They can be used as anchorage for fixed or removable dentures. Steiger's assertion that periodontitis does not occur after insertion of hollow inlays was confirmed.

The stability and the quality of retention of hollow inlays appear to be increased when compared with customary inlays. The mechanical resistance remains unchanged because of the increased thickness of the walls in the occlusal surface.

Although the fact that construction of hollow inlays requires an increased cement line around the margins has been used by some authors as an argument against this technic, Zerosi and the author have established that other inlay types such as saddle, MOD or extremely large inlays can be constructed as hollow inlays. Hollow inlays were found superior to customary inlays in "complex" molar cavities.

For the construction of hollow inlays, the indirect impression technic is recommended. The inlays can be easily prepared in wax models where they can be adjusted and modified without compelling the patient to undergo numerous sittings required when the direct impression technic is used.

The laboratory procedures, from the wax model stage to casting and polishing, are similar to those used in the indirect technic on galvanized models.

The problem of hollow inlays can be regarded as a purely technical matter. To produce a satis-

Figure 1 Indirect impression of distoocclusal cavity. Hollow inlay with mesial and distal pin attachment to be constructed

Figure 2 Galvanized model of prepared cavity

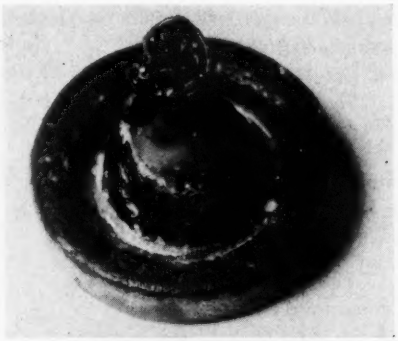

Figure 3 Hollow inlay on wax model

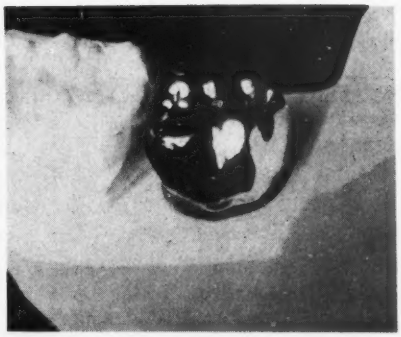

Figure 4 Hollow inlay on plaster model

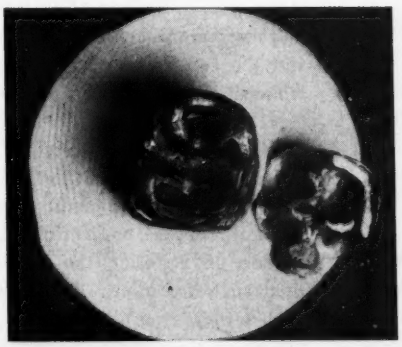

Figure 5 Hollow inlay after casting

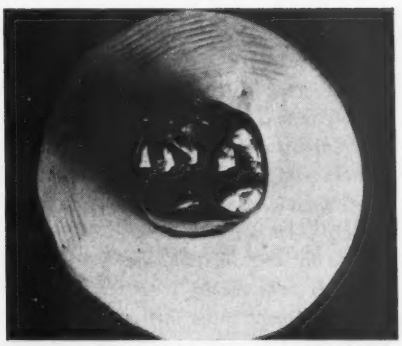

Figure 6 Hollow inlay ready to be inserted

factory hollow inlay, the dentist must have histological and pathological knowledge, mechanical skill, and a working experience of the materials used.

The advantages of hollow inlays consist of (1) the reduction of about a third in weight; (2) the decrease in thermal conductivity, and (3) the elimination of occlusal and periodontal trauma.

Every step in the construction of hollow inlays, from the cavity preparation to the final polishing, is important. Thoroughness is the keynote if success is to be achieved.

When a single, seemingly minor, short cut is attempted or when steps are taken carelessly, the dentist can only blame himself—and not the hollow inlay technic—if the inlay does not fit or if it fails later on.

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Role and evaluation of gold foil, silicate cement and acrylic resins in operative dentistry

Charles M. Stebner. *J.A.D.A.* 53:661-666 Dec. 1956

An attempt is made to evaluate the use of gold foil, silicate cement and acrylic resin in restoring Class III, IV and V cavities in anterior teeth, and to grade the three materials numerically against the ideal restorative material. Available laboratory tests and experiments are reviewed and histopathologic studies noted. The principal concerns are the health of the pulp and the patients. Clinical experience played an important part in the evaluation.

The factor of health was assigned a maximum of 40 points or 40 per cent of the total consideration; other factors and their percentages were as follows: function, 20 per cent; cavity seal, 20 per cent; technic and manipulation, 10 per cent, and esthetics, 10 per cent.

The total evaluation shows that gold foil is 80.5 per cent of the ideal restorative material, silicate cement rates 60.5 per cent and acrylic resin a poor third at 47 per cent. When the three materials were scored by five teachers and clinical dentists and five students of dental materials research, the combined groups of ten men allowed gold foil 82.8 per cent, silicate cement 59 per cent and acrylic resin 50.2 per cent.

From the standpoint of the patient's health, gold foil is the most desirable restorative material, silicate cement is second and adequate, but the acrylic resins fail and have no place in operative dentistry. Gold foil serves well from the standpoint of function, but silicate cement and acrylic resin are lacking. Gold foil is the only one of the three materials that seals the cavity, but silicate cement is considerably better than acrylic resin in this respect. Silicate cement is the easiest to manipulate, with acrylic resin second and gold foil the most difficult. Acrylic resin has the greatest esthetic possibilities.

More time and effort should be spent in the teaching and making of gold foil restorations. Additional restorative materials, such as silver amalgam and the gold inlay, might be compared using a similar system of evaluation.

903 Grand Avenue, Laramie, Wyo.

Proximal contour of Class II amalgam restorations made with various matrix band technics

Ralph W. Phillips, Cosmo R. Castaldi, Joe R. Rinard and Robert J. Clark. *J.A.D.A.* 53:391-402 Oct. 1956

Although amalgam has been the subject of many investigations, little objective analysis has been made of the matrix itself and the variables associated with it. This study deals with the contours that result from the various matrix band technics and the cervical overhangs which are thereby induced. Eight matrix band technics—Tofflemire, Sigveland, Ivory no. 1, Ivory no. 8, Universal matrixholder, technic advocated by Hollenback, technic advocated by Miller, and technic advocated by Markley—including five different mechanical retainers, were evaluated for their effectiveness in restoring the proximal contour of amalgam restorations. The three basic types of teeth—ovoid, square and tapering—were studied.

None of the technics reproduced perfectly the proximal surface. Deviations were slight with all procedures, however, when the bands were carefully contoured and wedged. Regardless of the

retainer employed, failure to wedge the band resulted in gross cervical overhang. Contouring alone produced a more normal contour, particularly on the square type of tooth, but it did not reduce the amount of overhang.

With the ovoid and square type of teeth, the point of greatest convexity had a tendency to be shifted occlusally when the bands were not contoured. Good reproductions of the proximal surfaces on the tapering type of tooth were obtained with all technics, even without contouring, when the band was wedged. The ovoid type of tooth proved to be the most difficult to reproduce with the mechanical retainers.

The use of a matrix technic which would, as nearly as possible, minimize cervical overhang and restore normal contour would seem necessary for the successful amalgam restoration. Although for ovoid and square teeth, both contouring and wedging are essential, wedging is of the greater importance. Best results were obtained by using both. Because of its anatomic shape, the tapering tooth does not benefit from contouring.

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Rehabilitation or equilibration

The modern concept of disturbances of the temporomandibular joint

G. Christensen. *Australian D.J.* 1:249-257 Oct. 1956

Costen in 1936 first suggested that symptoms of dysfunction of the temporomandibular joint may have their origin in some dental disturbance, namely, the loss of vertical dimension. Further research has shown that Costen's premises and concepts do not rest on anatomic and neurophysiologic facts.

The following observations have been recorded by the author on more than 300 patients with symptoms believed to be caused by disturbances of the temporomandibular joint:

1. The most frequent symptom is pain which may be present on awakening or which may increase in intensity during the day or after eating.
2. The pain is of variable distribution but is most often first located in the external auditory meatus or just anterior to it.
3. The pain may be in the nature of acute attacks of varying periods, but usually develops into continual discomfort.
4. On examination there is invariably tenderness to pressure over the condyle region during mandibular excursions.
5. Deafness associated with occlusion occasionally is encountered.
6. Giddiness and tinnitus are rare symptoms.
7. Clicking joints are often symptom free, especially if the click occurs at the extreme end of the opening phase. Should the click occur at the beginning of the opening or the end of the closing phase, however, there is often associated joint tenderness or facial pain.
8. Facial pain and joint tenderness are often unilateral.
9. Normal roentgenographic investigation by the author has conveyed no information of value in the investigation of facial pain.
10. Most patients with facial pain have their natural teeth and have no loss of vertical dimension or overclosure of the mandible.
11. The occurrence of typical joint disturbances has been observed in patients with pronounced open bites.
12. Excessive opening of the bite by means of new dentures or appliances sometimes has resulted in increased severity of the symptoms.
13. The most significant fact is that in every patient examined invariably there has been evidence of some degree of malocclusion, either interceptive contacts when closing from the rest position to the occlusal position, or pronounced cuspal interference during some mandibular excursion.
14. Often the correction of these occlusal defects results in a most dramatic relief of symptoms, sometimes even before the patient leaves the chair.

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Prosthetic dentistry

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Crown and bridge

A bridgemeter for abutment preparations

Charles B. Walton. *J.Pros.Den.* 7:93-98
Jan. 1957

A new instrument has been developed for use in paralleling abutment preparations when cutting teeth for fixed and precision bridgework. The instrument, a bridgemeter, is simple to use, lacks bulk, and is easily adapted to various tooth inclinations and to variable levels of occlusal surfaces of the abutment teeth.

Available paralleling instruments lack flexibility in reaching areas of the teeth that are not on the same occlusal plane and that are tilted in their axial relations. The bar and tube parallelometer is awkward to use and lacks flexibility of adjustment to varying distances between teeth and to the gingival margins of tooth surfaces. The

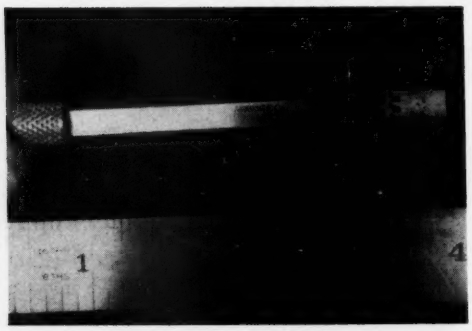

Figure 1 The bridgemeter with two small hinged segments at the working end and six parallel holes at various distances from each other to accommodate stainless steel pins

Figure 2 The bridgemeter used to align the pinhole in the cuspid with the proximal wall of a bicuspid preparation

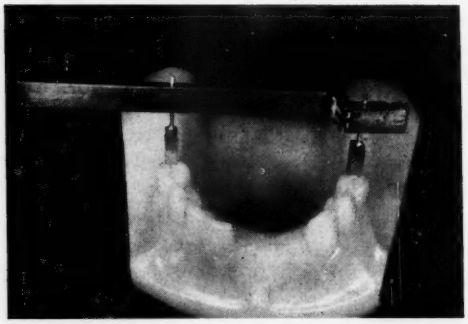

Figure 3 The bridgemeter with mandrels and platinum "shoes" for Neurohr attachments being aligned on lower bicuspids

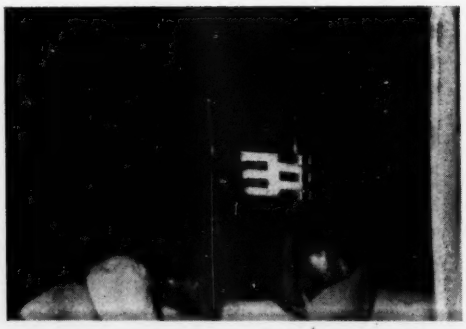

Figure 4 A precision rest in the bicuspid wax pattern being aligned with a proximal preparation in a molar

bridgemeter overcomes these objections, and permits the use of more than two paralleling pins so that multiple abutments can be aligned when necessary.

With the bridgemeter, opposing surfaces of the cavity walls of one abutment may be checked for parallelism, and mandrels for precision attachment boxes may be placed in the instrument so that space for these receptacles may be cut accurately into the abutment teeth. This minimizes the tooth substance cut away and can prevent complications in placing the female parts of the attachment in the abutment castings later.

The bridgemeter is a thin rectangular stainless steel bar about four inches long, with a knurled finger grip. The bar has two small hinged segments at the working end and six parallel holes at various distances from each other. These holes accommodate stiff stainless steel pins of 21 gauge or 0.028 inch, which are held in the holes by spring pressure. Pins may be placed easily in the holes that seem best suited to match the approximate distance between bridge abutments. One pin is always placed in a hole in the end hinged section.

The distance between the pins should be slightly greater than the span between the teeth when the instrument is fully extended. This allows the hinges to be flexed so the pin position can be adjusted accurately to the abutment surfaces. The pin may then be pushed up or down so that it will extend to the gingival margin of the tooth surface that is being cut.

The bridgemeter is useful when cutting pinholes in teeth at various levels; for aligning the box forms in teeth that are to carry precision attachments; when the abutment teeth are short and require a lingual clasp arm for retention of a removable prosthesis; against the contours of proximal surfaces of abutment teeth to guide the reduction of excessive proximal contours and prevent large spaces from occurring between the bridge strut and the abutment tooth below the height of proximal contour, and for aligning precision rests in fixed bridgework.

The small size, flexibility and simplicity of the bridgemeter facilitate the construction of fixed and removable bridgework.

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Brass used in place of dental gold
(Messing als Zahngold)

G. Klumbies. *Deut.Gesundheitswes.* 13:191-193 April 1, 1956

Forty patients were examined who had crowns and bridges made of brass. On the average, these brass crowns and bridges had been worn for four years prior to examination. In the majority of instances, pathologic manifestations appeared immediately after the insertion of these brass prostheses; in isolated instances, however, such manifestations did not appear until several years later.

Electrolytic reactions were more severe when another metal in addition to the brass was present in the oral cavity.

Localized inflammations of the mucous membrane were observed in 22 instances; gastrointestinal irritations in 20; severe loss of body weight in 17; abnormal fatigue in 26; peripheroneural disturbances in 16; disturbances in the central nervous system in 13, and vasodilatation or vasoconstriction in 22 instances.

After insertion of the brass prostheses, more than 50 per cent of the patients had required medical treatment. Three patients became unfit for work. Only one of the patients showed no pathologic symptoms.

In all instances, elimination of the brass prostheses and replacement with crowns and bridges made of dental gold obtained improvement or cure.

Follow-up examinations of acrylic bridges with the occlusal surface partially in gold
(En efterundersökning av akrylatbroar med ocklusalytor delvis i guld)

L. Thelander. *Svensk tandläk.Tskr.* 49:565-584 Oct. 1956

The low resistance of acrylic resins to abrasion has made it imperative to reinforce the occlusal surfaces with gold when the material is used in bridge construction. This has been done in a number of different ways. In the method proposed earlier by the author (1953) reinforcement of the surface has been limited to the part

that is in direct contact with the opposing teeth in centric occlusion. The anterior teeth generally have not been reinforced except in teeth with edge-to-edge occlusion.

From 1949 to 1951, 26 such bridges with five or more teeth were made for 23 patients. In 1955 follow-up examinations were carried out, and the degree of abrasion and discoloration of the acrylic teeth, and of gingival irritation and caries, was recorded.

Gingival inflammation was present in two instances, and caries was observed in one abutment tooth. Discoloration of the acrylic resin was observed in five instances.

Abrasion was observed in six instances, but in no instance had the crowns lost contact with their antagonists. The wear facets were small, and abrasion of the cusps was not seen. This is in accordance with the work by Kurth (1942) who showed that the movements of the mandible during mastication were restricted so that articulation took place within a small contact area.

▼ Complete dentures

Physiologic denture technique

Ralph H. Boos. *J.Michigan.D.A.* 38:315-325 Nov. 1956

Many anatomic conditions which affect denture construction require diagnosis and treatment before impression procedures are undertaken. Corrective treatment involves conditioning of the muscles, which in turn aids in providing a more normal position of the mandible and the condyle in the temporomandibular joint.

An exercise which stretches the muscles and lets them come back to a rest position is as follows: With the head held upright, the patient opens his mouth wide for about half a minute, then relaxes and allows the mandible to come to rest position. No attempt is made to position the jaw. The teeth should not come together. Next, the patient moves the jaw to the right as far as possible in a slow, continuous stretch, and allows the jaw to return to rest position; then moves the jaw to the left and return, forward and return to rest position, retrudes the jaw as far as possible and return, and then opens the jaw and allows it to return to rest position. The patient should do these movements for two or three minutes, four times a day—in the morning after arising, around ten o'clock, around three o'clock, and on retiring. Dentures should be removed if they interfere with the exercises. If the patient finds himself biting on his teeth, he should open his mouth and stretch the muscles to relieve tension. The exercise is not a method to develop muscle power but a procedure to relieve tension.

At the time the patient arranges for new dentures he should be put on the relaxation exercises. To condition his tissues, he should refrain from wearing his old denture for a minimum of from 12 to 14 hours before the final impression for a new denture is obtained.

A denture base made from a cast with a technic that does not displace the tissues will have about 20 per cent more tolerance to biting force than one made with a displacement technic, and about 10 per cent more tolerance than one made with the modified displacement technic.

The freeway space may vary according to the desired conditions of force and esthetics, but it must never be reduced to less than 2 mm. The patient must have a space between the teeth when the jaws are in rest position, or the muscles will be in tension. A physiologic centric relation may be obtained by closing from rest position in a normal, unstrained hinge movement. In about 65 per cent of patients, a centric relation established in this way will coincide closely with the centric relation established by the unstrained apex of the Gothic arch tracing, or by the unstrained posterior hinge axis. In the remaining 35 per cent of patients, there is a tendency for the jaw relation to be forward of the posterior terminal position.

A complete technic for denture construction includes a preliminary impression, use of a spacer tray, a nondisplacement final impression, wax check-bites, a Gothic arch tracing, recording of the condyle paths, a trial set-up of teeth, plaster registrations of rest position, and recheck milling.

The patient should be instructed in the hy-

gienic care of dentures and the need to avoid tooth occlusion as much as possible. Many patients should continue the relaxation exercise in order to reduce the habit of clenching the teeth, and to relax the oral structures.

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Quick denture repairs

Russell R. Burgess and Joseph A. Cantafio.
Illinois D.J. 25:717-720 Nov. 1956

The new self-curing acrylic resins make it possible for any dentist to repair dentures in his office in a minimum of time. The most commonly used technics for applying the acrylic resin to the repair region are as follows:

1. The powder (polymer) and liquid (monomer) are mixed in a jar to form a thin paste which is flowed or poured into the repair region and allowed to cure.

2. In the brush technic, a small paint brush is dipped into the liquid and brushed over the preparation, then dipped into the powder and returned to the preparation. These steps are repeated alternately until the repaired region is built to the desired bulk. Enough liquid must be present to keep the powder moist at all times.

3. In the dropper technic a medicine dropper is used to carry the liquid to the preparation. At the same time, enough powder is sprayed from a plastic dispenser to soak up the liquid present. This process is repeated until the necessary bulk has been applied to the repaired region.

With any technic, liquid should be used to wet the surface of the old acrylic resin before any powder or paste is added. Cleanliness is necessary; any contamination may lead to poor bonding.

Although experiments indicate that self-cured repairs are only 70 per cent as strong as heat-cured repairs, self-curing provides sufficient strength to withstand normal masticatory stresses and does not produce the warpage that accompanies heat-cured repairs.

Another factor affecting the ultimate strength of the repair is the manner in which the fracture lines are prepared to receive the acrylic resin. Tests show that the V joint is about 15 per cent stronger than the butt joint.

The following repair technics are suggested:

1. Repair of a fractured denture. The fragments are carefully fitted and waxed. A plastic matrix is poured to preserve the relation. Acrylic resin is removed at a 45 degree angle along both sides of the fracture line. Self-curing acrylic resin is added to excess, allowed to cure, and finished.

2. Replacement of a lost or fractured tooth. Remaining parts of the teeth are removed and the sockets are enlarged from the lingual surface; the inner surfaces of the sockets are stoned to remove the "molded skin." The replacement teeth are waxed in place and a plaster index is prepared. The wax is removed, and the self-curing acrylic resin is applied and allowed to cure.

3. Correction of a post-dam. Warmed compound is added to the post-dam region of the denture, corrected in the mouth, and trimmed to restore the contour. A plaster index is poured into the denture, undercut regions being avoided so that the index may be removed. The compound is cleaned from the denture and the region to be corrected is roughened with a stone. Self-curing acrylic resin is mixed to a thin paste and poured onto the index in the post-dam region. The denture is pressed into place and allowed to cure.

4. Adding a tooth to a partial denture. Full impressions are taken for models, and tooth and tissue areas are added; or simple replacements may be made directly. The tissue area is covered with wax, the tooth is added, and the contour and occlusion are corrected in the mouth. A model is poured inside the denture, the undercut regions being avoided. A plaster index is poured over the adjacent teeth, the added tooth and the waxed areas, with extension onto the model previously poured. The model is removed, the index is left in place, and the wax is removed. Self-curing resin is mixed to a thin paste, poured into the index, and the model is pressed into place and allowed to cure.

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Basic science

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Biochemistry

Distoclusion and brachycephalism produced in rats by endocrinological experiments

(Provocation expérimentale de distocclusion et brachycéphalie chez le rat par voie endocrinienne)

Louis J. Baume. *Rev.mens.suisse odont.* 66:369-379 April 1956

Endocrinological experiments with rats have been conducted at the Institute of Experimental Biology and at the College of Dentistry, both of the University of California. These experiments were later continued and concluded at the College of Dental Medicine of the University of Geneva, Switzerland.

In these animal experiments, female rats of the Long-Evans strain, hypophysectomized 27 days after birth, were given daily injections of hypophysial growth hormones for 450 days.

The result revealed that the endocrinological experiments produced craniofacial deformities such as prognathism, distoclusion and brachycephalism.

Histologic and metric comparisons with the control groups consisting of normal and hypophysectomized but untreated rats of the same strain revealed the following sites of the disproportionate growth in the treated rats:

1. Experimentally produced distoclusion was observed in the majority of rats which were treated with hypophysial growth hormones after hypophysectomy. Measurements of the prognathic mandibles indicated normal height but an increased gonial angulation. Histologic specimens of the condyles showed an activated endochondral and periosteal ossification but a deficient resorption. Measurements of the upper jaws showed a definite elongation of about 2.5 mm. Although the incisors were of almost normal dimensions, a lack of histodifferentiation of the enamel epithelium and an activated osteogenesis at the cranial sutures were observed. The cranial base was elongated in the anterior portion (porion and prosthion) but shortened in its posterior, opisthocranial, portion. The cranial length, however, remained equal to that observed in the normal control group. There was histologic evidence of an increased activity of the sphenooccipital synchondroses (which in rats remain open). These regions responded more readily to the injected hypophysial growth hormones than the region of the condylar cartilages.

2. Experimentally produced brachycephalism was observed in several rats treated. The width of the cranial base exceeded that observed in the control group by 2.9 mm. (14 per cent), which resulted in an increase of 8 per cent in the cranial index. The bizygomatic width exceeded that of the control group by 3.9 mm. (17 per cent).

3. The tracings of the skulls of all three groups, superimposed on the tragus, showed the reactions to the prolonged hypophysial growth hormone injections such as prognathism combined with distoclusion, flattened occiput and brachycephalism.

The results obtained also brought evidence of the fundamental principles involved in craniofacial development.

1. The longitudinal development of the craniofacial skeleton is effected by the activity of the cartilaginous growth centers at the base of the skull (synchondroses), and at the condyles by an endochondral ossification.

2. The activity of endochondral ossification centers induces periosteal and sutural growth at the periphery of the bones.

3. Prognathism and dolichocephalism result from a prolonged activity of the cranial cartilage centers. Brachycephalism and hyperorthognathism, however, are the consequences of an early arrest of this activity.

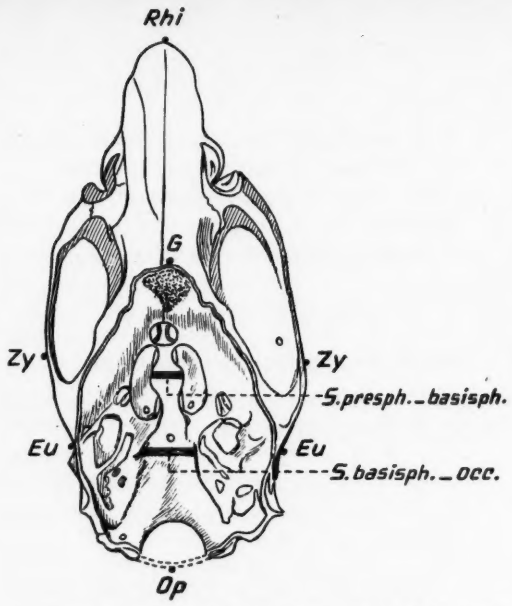

Figure 1 Dorsoventral aspect of normal rat skull. Rhi = rhinion; G = glabella; Zg = zygion; Eu = eurion, and OP = opisthocranium

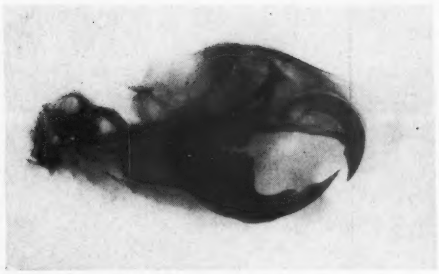

Figure 2 Skull of a hypophysectomized rat after injection of hypophysial growth hormones for 450 continuous days

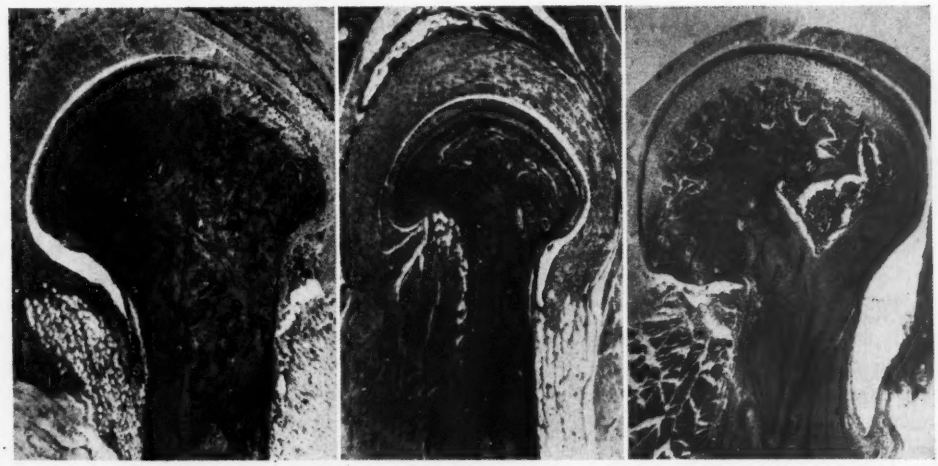

Figure 3 Transversal sections of the condyles. Left: Normal (control) rat. Center: Hypophysectomized, untreated (control) rat. Right: Hypophysectomized, treated rat

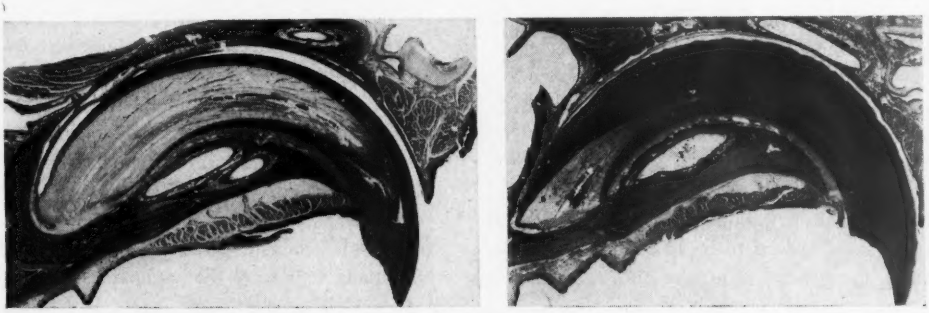

Figure 4 Longitudinal sections of an upper incisor. Left: Normal (control) rat. Right: Hypophysectomized, treated rat

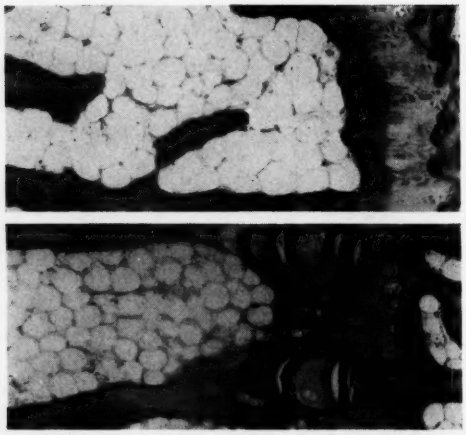

Figure 5 Histologic sections of synchondroses. Above: Hypophysectomized, untreated (control) rat. Below: Hypophysectomized, treated rat

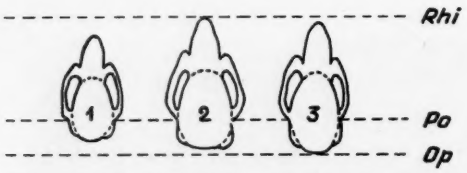

Figure 6 Tracings of dorsoventral aspects superimposed on porion axes. Left: Hypophysectomized, untreated (control) rat. Center: Hypophysectomized, treated rat. Right: Normal (control) rat

4. Proper coordination between the main growth centers is obtained by hormonal factors such as growth hormones which control chondrogenesis and osteogenesis and thyroxin which determines the maturation of the bones by epiphysial closure.

5. Condylar cartilages respond less to the injection of hypophysial growth hormones (after hypophysectomy) than basicranial cartilages. This disproportionate growth results in prognathism combined with distoclusion.

6. Functional compensation by protruding mandibles and osteogenic influences of growth hormones cause the development of brachycephalism and distoclusion.

7. The results of studies on distoclusion and brachycephalism, produced by endocrinological experiments, appear to be more reliable in disclosing the general principles and interrelations of the craniofacial developments than previous investigations in which the technic of superimposing serial roentgenograms had been used arbitrarily.

30, Rue Lombard, Geneva, Switzerland

Studies on platelet physiopathology

Paolo Introzzi and Pietro de Nicola. *Sc.med.ital.* 4:656-659 April-June 1956

Studies on the physiopathology of blood platelets and on various aspects of blood coagulation have recently been carried out by the staff of the Medical Clinic of the University of Pavia, Italy.

The results obtained provide new principles for the clinical characterization of both the factors and the functions of blood platelets.

The preliminary studies were directed mainly toward biologic considerations of the significance of platelet formation in the complicated mechanisms of coagulation and hemostasis of human blood, because both phenomena form the basis for the clinical problem.

Significant results were obtained in subsequent studies on (1) the variations in the thromboplastic activity occurring in isolated blood platelets in instances of hypocoagulability and hypercoagulability; (2) the relation existing between the thromboplastic and the adhesive function in blood platelets; (3) the relation existing between the lysis and the agglutination in blood platelets, especially taking into consideration both the morphologic aspects and the nascent condition of thromboplastin; (4) the characterization of platelet antigens by tests also applicable to general human pathology and (5) the evaluation of both the adhesive and the retractile functions of blood platelets in instances of platelet deficiency and other coagulative defects.

From the standpoint of the physiopathologist as well as from that of the general medical or dental practitioner, the relations existing between single platelet functions in the complicated process of blood coagulation and hemostasis have been determined.

If only an isolated factor or a single platelet function is deficient, especially in thrombopathic conditions, it is more than probable that associ-

ated defects will appear and alter the blood platelet formation. The results obtained in both the research on thromboplastic and adhesive functions and the studies on platelet lysis caused by agglutination have confirmed this assumption as a clinical fact.

On the basis of the results achieved, it will be possible to investigate further the alterations occurring in blood platelet formation which are similar but not identical to those occurring in nonthrombocytopenic diseases or other types of thrombopathy.

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Oxygen absorption of salivary microflora and its relation to caries

(Die Sauerstoffaufnahme der Speichelmikroflora und ihre Bedeutung zur Karies)

H. Eggers Lura. *Deut.Zahn Mund Kieferhk.* 24:177-189 June 1956

Recently, the relation which exists between the absorption of oxygen by the microflora of the human saliva and the incidence of caries seems to have become an important factor in the evaluation of data on caries activity and frequency.

In 1944, the author reported his determination of the oxygen absorption of saliva obtained with the manometer designed by Warburg.

In 1954 and 1956, under standardized test conditions, the saliva respiration was measured in specimens taken from 50 child patients who were resistant to caries and from 50 children who were susceptible to caries. The difference was significant.

Hartless and McDonald (1950), Burnett (1954), Bramstedt and Vorderlinn (1952), and Krönke and Naujoks (1954) also have reported on the oxygen absorption of saliva. The last four authors used the salivary oxygen absorption in caries tests and demonstrated its clinical value. Although Hartless, McDonald and Burnett have reported that they could not find a relation between oxygen absorption of the salivary microflora and caries, this negative result was influenced or promoted by an unduly prolonged storage of the saliva specimens used for the test, the employment of saliva stimulated with paraffin instead of normal unstimulated saliva which possesses a higher degree of oxidation capacity, and an artificially produced change in the pathologic condition of the oral infections investigated. These authors also used both the DMF index and Snyder's test, which are not absolutely reliable for determining the physiologically active factors in caries.

The author's investigation, however, has been directed toward establishing the fact that the microbial flora in caries differs essentially from the healthy oral flora. A series of additional tests was made later to determine the effect of different oxidation enzymes in saliva, the cytochrome oxidase, the peroxidase, the adenosine diphosphate and the thiamine pyrophosphatase which are active factors in catalyzing the fermentation of racemic acid.

The extreme buffer effects of plaque material and the observation "that caries resistant persons always are great acid producers" seem to indicate that the pathogenic role of acids in the development of caries has been overemphasized.

A new perspective in caries research has been opened by the recognition of the phenomenon of chelation by which the dissolution of the hard tooth substances is possible even by alkaline pH.

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Relations existing between the alkaline phosphatase in blood serum and the phosphatase in cysts of the jaws

(Sui rapporti fra le fosfomonoesterasi alcaline del siero e le fosfomonoesterasi delle cisti del mascellare)

Pierantonio Wiel. *Riv.ital.stomat.* 11:175-181 Feb. 1956

At the dental ambulatorium of the United Hospital of Venice, Italy, serial examinations have been carried out to establish whether a relationship exists between the alkaline phosphatase in the blood serum and the phosphatase in the liquid contents of cysts of the jaws.

The results revealed that every increase in the alkaline phosphatase in blood serum immediately was paralleled by an increase in the phosphatase in the cystic fluids.

The enzymic action, splitting the phosphoric acid esters of carbohydrates, depends on the carbohydrate metabolism, nucleotides, phospholipids, and bone formation. A high rise in alkaline phosphatase in both liquids after cystectomy is always followed by an immediate decrease during the healing period until a normal balance is reached.

The activity of the phosphatase in both fluids is influenced by rarefaction of osseous structures.

In instances of periodontal disease, the level of alkaline phosphatase in blood serum is extremely high. In dystrophy, however, it is comparatively low.

Influence of calcium content on effect of fluoride in development of predentin and dentin (Der Einfluss des Calciumgehaltes im Blute auf die Wirkung des Fluors im Prädentin und bei der Dentinbildung)

J. T. Irving, Capetown, South Africa. *Deut. Zahnärztebl.* 10:688-689 Sept. 1956

At the Dental College of the University of Capetown, the influence exerted by the calcium metabolism on the effect of fluoride in the development of predentin and dentin has been studied in animal experiments.

Two strains of rats were used in these studies. Group 1 consisted of rats with severe calcium deficiency, and Group 2 of rats with slight calcium deficiency. The main difference between these groups consisted in the varying quantity of calcium and inorganic phosphorus in the blood.

The studies were designed to establish whether the course of calcification can be altered in an experimentally produced dentin border.

Previously, it was determined that in starving rats, the calcium level in the blood decreases. Medication with vitamin D increases the calcium level temporarily.

The studies also should establish whether a relation exists between the effect of fluoride and the calcium metabolism in the blood.

Because these studies were carried out with a limited number of animals, there can be no definite conclusions based on comparative data; however, certain factors have been demonstrated as follows:

1. The experimentally produced dentin border consists of a hypercalciferous layer which, in the central region, is formed by a reaction of the dentin to the effect of fluoride. This layer originates in the predentin which, at the time of the fluoride injection, has been in the stage of development.

2. In all instances in which the calcium metabolism had been at a low level prior to fluoride injection, the calcification process in the experimentally produced dentin border was premature. The development of the predentin unquestionably was influenced by the fluoride.

3. Hypercalcification appears only at the time in which normal calcification would have occurred without fluoride medication.

Influence of metabolism on the chemical properties of saliva (L'influence du métabolisme sur les propriétés de la saliva)

H. Hafer. *Zahnärztl.Praxis* 7:3 June 1, 1956

A relation exists between the physical and chemical processes of the whole organism and the isolated chemical properties of the saliva. The quantity of saliva secreted depends on the flow of blood to the salivary glands, which flow is regulated by the vegetative nervous system.

Production of salivary mucin depends on the same hormonal control mechanism as alterations in the connective tissue; both contain considerable amounts of glucosamine.

Salivary thiocyanate is a derivation of thiamin, and is related to the carbohydrate metabolism and to insulin activity. Insulin may influence the activity of salivary diastasis.

The buffering powers of the saliva depend on substances in the blood which are able to decrease or prevent reactions to chemotherapeutic agents. The buffering powers of the blood are influenced constantly by the pressure of carbon dioxide originating in cells or by the need for carbon dioxide in the liver.

The constant pressure of carbon dioxide on the blood buffers may result in an alkalosis of the extracellular space. Absorption of carbon dioxide from the blood can lead to acidosis of the extracellular space.

Carbon dioxide pressure can be produced artificially in animal experiments or in test persons by applications of carbon dioxide bicarbonates, or of other organic acids which have been oxidized with carbon dioxide.

Resorption of carbon dioxide also can be produced experimentally by medication of ammonia. Changes in the acid base metabolism and in the buffering powers of the saliva have been obtained by medication of 17 mg. ammonia daily in test persons.

These findings may have an important influence in future research on etiology and the prevention of dental caries.

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Psychology

Teeth, trauma and the dentist-patient relationship

Robert A. Savitt. *J.Hillside Hosp.* 5:392-401 Oct. 1956

Details from psychoanalytic observation of dental patients and dentists are cited to illustrate some of the complexities which may occur in the dentist-patient relationship.

The dentist works in one of the most sensitive and important regions of the body—the mouth, an area with a high narcissistic investment. The dentist starts off the professional relationship with the handicap of being regarded by his patient as an aggressor. In the dreams of patients, the dentist often appears as a castrator, rapist, murderer and torturer. By the very nature of the technical dental procedure the dentist is consciously and unconsciously regarded as an aggressive, destructive, threatening individual. His instruments inflict pain, rip tissue, surgically mutilate and draw blood. He shoves long, threatening needles into sensitive tissues. He reactivates the childhood fear of mutilation which exists in all people at all times.

Many people are reluctant to go to dentists because they fear pain. The very nature of the dentist's work provokes a primitive feeling of avoidance. Some of the patient's reluctance and fear could be obviated if the dentist was able to manage his patients better psychologically. For this the dentist must be emphatic, understanding of human frailty and fear, and be willing to listen to the patient. He needs also to take the time to explain to his patient some simple, understandable aspects of the physiology of teeth and the mechanics of repair. A patient with knowledge of what to expect frequently can be relieved of fear.

Some dentists pay lip service to the human factor in professional relationships but are impatient and intolerant when confronted with it. They feel that any psychological aspect belongs in the psychiatrist's office. Yet relatively few emotional problems need to be referred to the specialist. The management of the usual psychological problem associated with dental treatment should be part of the dentist's job.

Therapeutic success or failure can hinge on the dentist's attitude. The mechanical effectiveness of the dentist can be enhanced by a "healing personality." The intelligent management of the patient's psychic response is part of the dentist's job and ranks in importance with his technical skill.

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Psychogenic influences on the electrosensitivity of vital pulps

(Psychogenni ovlivběni elektrické dráždivosti zubni drěně)

J. Kominik, E. Rozkovcová and L. Srp. *Československ. stomat.* 55:172-196 April-May 1956

The staff of the Dental Institute of the University of Prague, Czechoslovakia, recently undertook serial experiments to determine the degree of sensitiveness of vital pulps to electric currents after direct and indirect suggestion.

The first permanent molars of 60 Czech children, whose average age was 11.2 years, were the objects of the investigations.

The child patients were divided into two equal groups, and from another 30 children a control group was formed.

The measuring of the temporary anesthesia induced by the passage of electric currents, and

that of an imagined dental anesthesia produced by direct and indirect suggestion was carried out in three stages: (1) before cavity preparation; (2) during and after endodontic treatment and (3) after purely psychogenic influences.

In Group 1, the cavities were left unprepared until the third measurement of sensitivity to electric current was taken. To children in Group 2, it was suggested that no pain would occur during and after root canal treatment. To intensify this suggestion, a placebo consisting of roll of cotton saturated with a sodium chloride solution was inserted into the mouth and left for two hours.

The results of the serial examinations revealed that in Group 2, the anesthetic effects of pure suggestion combined with a placebo were as high as (and in isolated instances higher than) those of the electric anesthesia applied to children in Group 1.

In the control group, no unusual changes could be observed.

Suggestion can have an objectively demonstrable influence on the electrosensibility of vital pulps, and the applicability of purely psychogenic influence in pedodontic treatment seems to be evident. This fact can be utilized not only to obtain immediate success in root canal treatment but also as an important factor in facilitating future care of the dentition.

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Biophysics

Separation of enamel from dentin in human and rat teeth

(Die Trennung von Schmelz und Dentin bei Menschen- und Rattenzähnen)

F. Rozeik, R. Hannover, M. Herrmann and H. D. Cremer. *Deut.zahnärztl.Zschr.* 11:254-258 March 1, 1956

At the Dental Institute of the University of Mainz, Germany, experiments were undertaken to separate enamel from dentin in human and rat teeth.

With the aid of centrifugal separation disks, enamel and dentin, after having remained for a considerable time in a brom-phenyl-mercapturic acid solution, were separated, and their chemicophysical properties analyzed.

The whole human teeth examined consisted of about 80 per cent dentin and cementum and 19 per cent enamel. Their isolated crowns contained about 60 per cent dentin and 33 per cent enamel.

The established specific volume of enamel was 2,800, and that of dentin 2,200. For the determination of the specific volume, only specimens of pure enamel and dentin were used.

The whole rat teeth examined had an average specific volume of 2,600. The "gnawing teeth" (incisors) of rats consisted of 94 per cent dentin and 4 per cent enamel. The crowns of rat molars, however, contained 23 per cent enamel and about 70 per cent dentin. The specific volume of enamel was 2,750, and that of dentin 2,100. For these tests, only specimens of pure enamel and dentin of rat molars were used.

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Pathology

Studies on mineralized dental tissues. VIII. Histologic and microradiographic investigation of hereditary opalescent dentine

Gunnar Bergman, Bengt Engfeldt and Irene Sundvall-Hagland. *Acta odont. scandinav.* 14:103-117 Sept. 1956

The term "hereditary opalescent dentin" refers to a disturbance in the development of the teeth characterized by an irregular structure of the dentin, with widely separated and curled dentinal tubules; by posteruptive obliteration of the pulpal cavity; by short roots; by a tendency to enamel fractures and pathologic attrition, and by opalescence and color changes in the crowns of the teeth.

Thirty-eight deciduous and permanent teeth from ten children with the clinical diagnosis of

hereditary opalescent dentin were studied histologically and microroentgenographically. In nine of the ten children there was a family history of similar dental changes. None of the patients had any physical or roentgenographic evidence of skeletal disorders.

The enamel in the 38 teeth was normal, but the dentin showed pronounced pathologic changes in all of the teeth. It was more or less irregular, and wide canals, different in character from the dentinal tubules, crossed the dentin. These wide canals probably act as pathways for the entry of pulp infections. In the periphery of these canals was frequently a high content of mineral salts. The pulp was mostly necrotic.

Microroentgenographic investigation showed that the dentin often was irregularly mineralized.

Histologic changes in the dentin of the teeth from various patients showed great variations. The variations suggest the possibility that the dental changes classified clinically as hereditary opalescent dentin may represent more than one etiologic factor.

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Facioplasty in instances of malignant tumors

(Neko iskustva u terapiji malignih tumora lica)

Vinko Arneri. *Vojnosan.pregl.,Belgrad* 13:118-126 March-April 1956

At the Clinic for Plastic Surgery of the Yugoslavian Army Medical Academy in Belgrade, 70 patients with different types of malignant tumors have received surgical treatment during the last seven years.

The sites of these tumors were as follows: 30 on the lips; 5 on the cheeks; 10 in different parts of the oral cavity; 15 on the nose, and 10 on the scalp.

Facioplasty was performed with complete cooperation between clinical pathologists, roentgenologists, plastic surgeons and dentists of different branches.

Although facial tumors mainly appear on exposed and easily accessible parts, early and correct diagnosis had been made only in 5.5 per cent of the cases. In most instances, there was no visible primary evidence of a carcinogenic condition, but malignant tumors developed later in scars caused by previous operations and after herpes or lupus.

Roentgenotherapy was applied in the majority of instances, but it proved to be inadequate for cure, and at the roentgenologist's suggestion subsequent surgery was performed. In other instances relapses of basal cell carcinomas occurred.

Tumors of the lips were of the planocellular type, and in 26.1 per cent of the cases accompanied by involvement of the regional submandibular lymph nodes. In two instances of malignant tumors of the lips, metastases occurred one year after surgery, leading to death.

As a preventive procedure, all morbid lesions caused by roentgen rays, scars or keloid formation were radically excised.

When malignant tumors had developed over cartilaginous structures, facioplasty by skin grafting followed the radical surgical excision. When the incision wound could not be repaired immediately, temporary grafts (Thiersch's method) were placed, and permanent reconstruction postponed for at least one year.

In instances in which it was suspected that traces of carcinomatous tissue might have remained, roentgenotherapy followed facioplasty.

If one fourth or less of the lip was excised, the wound was sutured immediately; if one half or more of the lip was removed, the loss was repaired by using either Bernard's or Estlander's methods. In instances of complete resection, the reconstruction was performed with tubular grafts (Gillies' method).

Loss of facial skin was repaired by local or free grafts from the forehead.

Postoperative examinations revealed that after from one to seven years, no relapses or metastases occurred in 53 patients. In seven patients relapses occurred after from one to six years. Five patients died after metastases appeared, and three from unknown causes. The outcome in two patients is uncertain because information regarding them is unobtainable.

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Preventive and public health dentistry

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Caries etiology and control

Importance of enamel structure in caries prevention: the fluorine problem

(Die Bedeutung der Schmelzstruktur in der Kariesprophylaxe: eine Stellungnahme zum Fluorproblem)

Ewald Harndt. *Deut.zahnärztl.Zschr.* 10:874-883 June 15, 1956

There is little doubt that the most widely accepted theory on caries etiology is the hypothesis that caries is caused by an initial decalcification by lactic and pyruvic acids which are by-products of carbohydrate degradation. It is, however, physically and chemically impossible for acids formed by the enzymolysis of food particles in the oral cavity to reach the zones of an advancing caries to decalcify the enamel. Microorganisms producing caries have no movement of their own and must, therefore, advance by proliferation along certain definite lines.

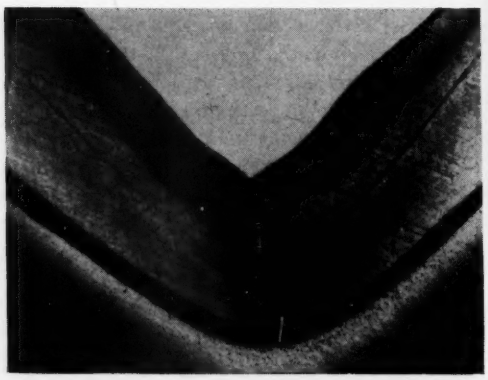
Microscopic examination of the dentin has revealed that these lines are identical with the strata which are richest in albumin (the odontoblastic processes). What is true of dentin and of the inner zone of enamel must also be true of the enamel surface.

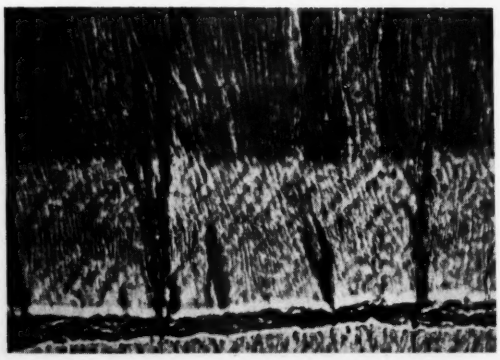
The filling of depressions in tooth surfaces, fissures and open cavities soon after occurrence and detection remains the most practical and reliable method of checking the progress of caries, reducjng oral infection and loss of teeth. This method alone, however, is not sufficient. It is necessary to control caries by preventive measures, especially in caries-susceptible persons.

The enamel structure of the human tooth is a solid mineral substance. Even the finest lenses cannot detect a difference between ground moist enamel of a living tooth and that of a tooth which has lain buried in the earth for several centuries.

Starting with the premise that enamel is composed of inorganic matter, principally phosphate, carbonate of calcium, and small quantities of magnesium, and that chemically no difference exists between the enamel rods and the cement-

Extrauterine enamel of an upper central incisor extremely rich in organic ground substance





The masticatory surface of the crown of a deciduous molar. Neonatal lines separate the intrauterine enamel from the postnatal enamel

ing substance which holds these rods together, it can be concluded that defects in the enamel are caused by interferences in the deposition of salts.

To prevent such interferences, a decrease in the intake of carbohydrates is essential. The complete elimination of carbohydrates from the human nutrition—as desirable as it may be—is impossible. Neither public health measures nor mechanical restorations can effectively arrest the world-wide progress of caries. A biologic and systematic treatment is needed.

An abundance of indisputable evidence is available, compiled by researchers of different countries, that fluorides inhibit caries. Fluorides in dilute solutions have beneficial effects on the teeth of children either by topical applications of sodium fluoride to tooth surfaces or by general fluoridation of drinking water.

Analytic data on enamel and dentin structures reveal that fluorosed and macroscopically determinable mottled teeth contain from three to five times more fluorides than normal teeth. The fluoride content of tooth structures is proportional to caries resistance. Microscopically, the difference between fluorosed and healthy tooth structures lies in the fineness of the background structures appearing in fluorosed enamel and dentin.

In animal experiments (Rost, Hauck, Steenbock, Parsons, Knappwost, and Schubert), it was disclosed that fluorides have, besides the caries-preventive effects, an antirachitic effect similar to that of vitamin D.

Dentists and the general public, however, should not overlook the dangers created by the much advertised products such as fluorine tablets, fluoridated salt, tooth pastes, mouthwashes, chewing gums and candies. Uncontrolled consumption of these fluoridated products may easily bring about an intake of fluoride much higher than the optimal dose.

Research data do not support the assumption that inhabitants of areas in which the drinking water is rich in fluoride have a greater prevalence and severity of periodontal disease than those residing in nonfluoride or fluoride-poor regions.

Raising the concentration of fluoride-deficient water supplies to the optimal level of from 1 to 1.2 ppm fluoride is, on the basis of all available evidence, a caries-preventive measure with a wide margin of safety.

It is possible, however, that other trace elements such as vanadium or strontium have an even stronger caries-preventive effect than fluoride (Röse).

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The possibility of using iron fluorides in topical applications: a study in vitro

Per Torell. *Odont.Tskr.* 65:189-194 June 1956

One drop of a 0.1 M iron alum solution was applied on enamel preparations; one minute later, one drop of a 0.2 M ammonium fluoride solution was applied. One minute later, the excess solution was absorbed with filter paper. The preparations were then incubated alternately 80 times in saliva (three hours) and 80 times in "sugar acid" saliva (one hour). As controls, preparations treated with a 0.1 M iron alum solution for one minute and preparations treated with 0.2 M ammonium fluoride solution for one minute were incubated in the same way.

Destruction was significantly less in the "iron fluoride" treated preparations than in the controls. It is concluded that iron fluoride solutions may be used in topical applications on dental enamel *in vivo*.

The disposition of different types of foodstuffs in and around the teeth after eating

Alexander B. MacGregor. *Australian D.J.* 1:195-201 Aug. 1956

The possible association between carbohydrate intake, especially refined sugars, and dental caries has been noted for years. There have been protagonists on both sides. Work in recent years has tended to suggest that the quantity of carbohydrate ingested may not be so important as the form in which it is eaten. It has been shown by Nevin and Walsh, and Nevin, that both the shape of the interproximal spaces between the teeth and the physical properties of the food, for example, its permeability, adhesiveness and "packing quality," are important.

It occurred to the writer that an additional

factor might be the actual force used in chewing and that whereas the average boiled sweet splinters on biting, and chocolate fragments and melts, a toffee requires considerable force in the early stages of softening and might act almost like a piston in driving portions of itself into fissures and between the teeth, when the teeth close hard on it.

A technic was found by which different types of foodstuff could be traced, both macroscopically and microscopically, in and around the teeth after eating. Blue copper phthalocyanin dye was incorporated in toffees, chocolate and boiled sweets.

Two main groups of persons were tested. In one, dental students were asked to chew a toffee containing the dye on one side of the mouth. The region in which the toffee was chewed was examined and photographed: (1) within five minutes of finishing the toffee, (2) 20 minutes after finishing, and (3) one hour after finishing. At a later stage, chocolate and boiled sweets were employed in the same way on the same batch of students to see if any significant differences existed in the time of retention or disposition around the teeth between the different common forms of confectionery.

In the second group patients about to have one or more bicuspids or molars extracted were asked to chew a toffee in this region immediately before the extraction. After extraction the tooth was examined and photographed, then split across the fissure, examined by reflected light and photographed.

In the first group, all 12 students revealed toffee in large amounts adhering around fissures and interstitially and cervically in the region of chewing within five minutes of finishing the toffee. Twenty minutes after the start of chewing, toffee was still present in quantities capable of photographic record in all students, and one hour after finishing the toffee traces were still observable and capable of photographic record in 10 out of 12 students.

With chocolate, the picture in the mouth immediately after chewing was not very different to that seen after toffee. With boiled sweets at this time there was also a residuum but not so great as with chocolate or toffee. A great difference was seen 20 minutes after chewing; in only 3 of the 12 students was any chocolate revealed by the dye and a slight trace seen in 2 students after boiled sweets.

In teeth extracted after the chewing of toffee, a pattern of toffee was normally found outlining the fissures with traces of toffee in these fissures seen when viewed by reflecting light from above. On splitting such teeth across the fissure, it was found that the toffee had been driven into the fissure—in many instances apparently right down to the bottom.

These experiments are of a preliminary nature, and final conclusions cannot be reached until further work has been done.

Present status of controlled fluoridation in the United States

Pub.Health Rep. 71:963-966 Oct. 1956

From 1945, when controlled fluoridation was introduced, through May 2, 1956, 1,352 communities in the United States served by 727 water supply systems instituted fluoridation. Sixty-six communities served by 54 water supply systems discontinued fluoridation; of these, seven communities, each one its own water supplier, reinstituted the procedure. By May 2, 1956, a net total of 1,293 communities with 26,000,000 people were served by 680 water supply systems to which fluoride had been added.

Of the 1,255 communities using controlled fluoridation at the end of 1955, nearly 30 per cent were under 1,000 in population, or of size not specified. A little more than 30 per cent of the communities using fluoridation range in size from 1,000 to 5,000 in population. Another 30 per cent are between 5,000 and 50,000 population. The remaining 6 per cent are over 50,000 in population. Nearly 45 per cent of the communities of 500,000 population or over are fluoridating their water supplies, and from 20 to 30 per cent of the communities of 10,000 to 50,000 population. For communities of less than 10,000 population, the percentage fluoridating their water ranges from 4 to 14 per cent. The proportion of communities that have instituted controlled fluoridation increases almost directly with grouped community size.

In almost all communities the problem of whether or not to fluoridate is decided by the governing body; in only 6 per cent of the communities was the question of fluoridation decided by referendum.

During the past few years, the number of people drinking fluoridated water has increased by about 4,000,000 persons a year. There is every reason to believe that this rate of increase will not decline, and may become greater.

Ten cities of over 500,000 persons do not have fluoridation, and some 16,000 communities of under 10,000 population are not using fluoridated water.

Division of Dental Public Health, Bureau of State Services, U.S. Public Health Service, Department of Health, Education, and Welfare, Washington 25, D.C.

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School dentistry

Dispensary of hygiene for school children in Cuba (Este dispensario de higiene escolar fué el primero de su clase en Cuba)

Protesis clin. 17:1-2 June 1956

The twentieth anniversary of the establishment of the Dispensary of Hygiene for school children in Cuba, with headquarters at 1117 Calle Monte, Havana, was observed recently. The celebrations included a scientific meeting presided over by Dr. Aníbal Herrera, the founder and head of the dispensary.

This dispensary was the first of its kind to be instituted in Cuba. Help is given only to children of school age. The dispensary was inaugurated on May 16, 1936, and during these 20 years it has always been at the same address. The dispensary is a social institution supported by the government except for some minor expenses. It has an autonomous council of directors who are the constituent members and who appoint the director. When the dispensary was first opened, the staff consisted of eight persons, including two dentists. Now it consists of more than 40 medical professional persons, including 12 dentists. More than 1,000,000 professional services have been given since its establishment.

More than 100,000 children have received dental care such as treatment, prevention and control of caries, laboratory and roentgenographic services and prevention and treatment of dental and buccal diseases.

In the year 1954-1955, dental services to school children included 4,850 extractions, 245 fillings and 1,242 other dental services. Plans for expanding the dental services are underway.

Orthodontic work performed in the central stomatologic polyclinic for children in Tiflis in 1953-1954 (Rabota ortodontitcheskavo kabineta Tbilisskoj centralnoj detskoi stomatologitscheskoj polikliniki za 1953-1954

B.L.Botzvadze and G.C. Nishniandze. *Stomat., Moscow* 4:62-63 July-Aug. 1956

An orthodontics office in the Children's Stomatologic Polyclinic of Tiflis was established in 1948. Teams of dentists are appointed for schools, and the general condition of the mouths of all children is checked. All instances of malocclusion are referred to orthodontists for correction. Data are recorded of treatments performed, from January 1, 1953, during the nine month school year and from January 1, 1954, until the end of May. During these 14 months, 323 children with various occlusal deformities were examined. Treatment was performed on 204 children and was completed on 83 children (58 girls and 25 boys).

The methods for correction of malocclusion are classified as functional and mechanical. For the former method, appliances were used such as crowns by Katz, overlays by Binin and Schwartz, and bite plane by Katz. For mechanical correction, the following appliances were used: Angle's arch, Binsworth's arch, screw devices and the combined extension plate by Hurgin.

Two cases are reported in which the devices for correction of Class III malocclusion with overlays by Binin and Schwartz to the maxillary central incisors led to open bite. The best results,

without complications, were obtained by use of Angle's arch appliance.

In order to prevent conditions leading to malocclusions, lectures were given by radio to the public, the parents were counseled, two essays were presented at meetings of the Association of Stomatologists, and a booklet was published, *How to Prevent the Abnormal Development of Teeth.*

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Hygiene and prophylaxis

Silver toothpick with safety action

(Silberzahnstocker mit oligodynamischer Wirkung)

Gustav Klein. *Quintessenz* 7:800 Sept. 1956

No toothbrush is on the market which is able to clean the interproximal spaces completely. For adequate oral hygiene, toothpicks must be used.

A toothpick is more convenient to use than dental floss. Although it has often been asserted that toothpicks may injure the gingival tissue, the employment of dental floss does not prevent similar injuries.

The solution lies in the construction of a toothpick convenient to use and appropriately guarded so as not to injure tissue. Wooden toothpicks have a tendency to split and splinter, and frequently are too thick. Toothpicks made of synthetic plastics are also too broad and too thick. They press food particles remaining in the interproximal spaces into the gingival pockets. Most metal toothpicks also are objectionable because they are too hard and may cause gingival injuries and abrade the dentin which is softer than the metal used.

The author has introduced a new type of toothpick which does not possess these disadvantages. This toothpick is constructed of silver with a high degree of fineness. A silver sheath hooked to the toothpick serves as a handle.

Silver is softer than dentin and by using this type of toothpick, the dentin will not be abraded.

The silver toothpick is graceful and thin in design, and all food particles remaining in the interproximal spaces can be removed easily and quickly. Only careless manipulation can bring about injury to the gingiva.

Clinical experience has proved that in patients using the silver toothpick regularly, caries of the interproximal space is not observed. This can be explained by the anticarious property of the silver traces which remain on tooth surfaces after constant use of this type of toothpick.

Elimination of calculus with chemicals

(Die Zahnsteinentfernung durch chemische Mittel)

Josef Kluczka. *Zahnärztl.Praxis* 7:2 July 15, 1956

For a long time, dentistry and the chemical industry have attempted to obtain chemicals which can be used successfully for a safe elimination of calculus deposits.

Younger recommends glucuronic lactone; Head favors ammonium bifluoride. German dentists use, more or less successfully, cysteine hydrochloride, ethylene diamine tetraacetic acid and its disodium and tetrasodium salts and thioglycolic acid. Weight loss of calcium deposits varies from 0.0226 to 0.0984 mg.

Prinz reports that he found an effective chemical which consists of 1 per cent phloroglucin, 15 per cent sulfuric acid, and distilled water. In this chemical solution, the phloroglucin acts as a buffer.

Available evidence indicates that the inorganic constituents of calculus deposits in the oral cavity are derived mainly, probably entirely, from human saliva. Calculus-like deposits already have been produced *in vitro* from human saliva.

It would appear that some of the recently introduced chelating agents might prevent the formation of calculus or, when already formed, might assist in their chemical elimination.

Further investigations will determine whether certain chemical compounds, mainly the sequestrating or the chelating agents, are capable of dissolving calculus deposits in the oral cavity, and whether these compounds can affect the integrity of the tooth structures.

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Oral surgery

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Roentgenology

Damage to tooth structures produced experimentally by roentgenization

(Experimentelle Schädigung der Zähne durch Röntgenstrahlen)

M. Herrmann and F. Rozeik. *Zahnärztl.Reform* 57:41-45 Feb. 1956

The staff of the Dental Institute of the University of Mainz, Germany, has undertaken serial experiments on dental caries produced by experimental xerostomia. The result has been reported previously in *Zahnärztliche Reform* 56:458-461 Dec. 1955, and DENTAL ABSTRACTS 1:515-516 Sept. 1956.

It was established that caries artificially produced by xerostomia progresses in the usual manner, but it differs in symptoms and course from caries produced experimentally by roentgenization.

Recent experiments were directed toward investigation of damage to tooth structures produced experimentally by roentgenization of 24 adult guinea pigs and 33 adult rats.

The guinea pigs were divided into four groups of six animals each: Group 1 received 1,000 r, and a cariogenic diet; Group 2 received 1,000 r, and a normal diet; Group 3 received 2,000 r, and a cariogenic diet, and Group 4 (control group) was not subjected to roentgen rays but was fed a cariogenic diet.

The rats also were divided into four groups: Group 5 (seven rats) received 1,000 r, and a cariogenic diet; Group 6 (six rats) received 1,000 r, and a normal diet; Group 7 (ten rats serving as the first control group) was not exposed to roentgen rays and was fed a normal diet, and Group 8 (ten rats serving as second control group) was not exposed to roentgen rays but fed a cariogenic diet.

One half of the mandible of guinea pigs and rats was isolated and then exposed to roentgen rays after all neighboring tissues had been protected carefully from the effects of roentgenization. The exposure time to 1,000 r was 55 seconds, and to 2,000 r, 110 seconds.

The cariogenic diet (Roine) consisted of 30 per cent casein; 5.6 per cent olive oil; 40 per cent powdered sugar; 15 per cent cellulose; 2.5 per cent potassium acetate; 6 per cent sodium chlo-

Figure 1 Left: Root of a rat molar after roentgenization: downgrowth of epithelial tissue, destruction of odontoblasts in the root canal, and vasodilatation. Center: Two roots of a rat molar after roentgenization: resorption in the cementum and downgrowth of epithelial tissue. Right: Two rat molars after roentgenization: periodontitis leading to expulsion of one molar, necrosis and abscesses in the pulp region

Figure 2 Left: Root of a guinea pig molar after roentgenization: lacerations in the pulp region, fissures in the enamel strata, hemorrhage and decomposition in the bone marrow. Right: Pulp of a guinea pig molar after roentgenization: disintegration and partial destruction of the soft, vascular tissue in the pulp chamber caused by severe hemorrhage

ride; 0.5 per cent magnesium oxide; 2 per cent choline chloride, and 0.2 per cent inositol.

To each 200 Gm. of food was added: 0.2 Gm. vitamin C; 1.6 mg. vitamin B_1; 1.6 mg. vitamin B_2; 1.6 mg. vitamin B_6; 4 mg. pantothenic acid plus calcium; 20 mg. aminonicotinic acid; 10 mg. folic acid; 0.004 mg. vitamin B_{12}; 0.6 mg. biotin; 0.6 mg. vitamin A acetate; 2 mg. vitamin E; 0.004 mg. vitamin D_3, and 0.02 mg. vitamin K.

After roentgenization, the animals were kept on the diet for 150 days. They were then sacrificed, their jaws dissected and prepared, and the structures examined roentgenographically for carious lesions and damage caused by the roentgen rays.

Despite the effects of roentgenization and the cariogenic diet, it was impossible to produce experimentally dental caries in guinea pigs. In rats, however, isolated carious lesions were observed. No increase in caries frequency caused by roentgenization was established.

Histologic examination revealed:

1. In rats: extensive ulcerative changes in the epithelium of the mucous membrane; simultaneous destruction of the epithelial strata on tooth surfaces; decomposition of the alveolar bone in the molar region; hemorrhage in the pulp; vasodilatation; edema; degenerative symptoms; atrophy; formation of vacuoles, and disintegration of odontoblasts.

2. In guinea pigs: destruction of soft tissue in the region of the root apexes; hyperemia in the pulp; laceration of vessels; extravasation of blood into neighboring tissues; destruction of dental germs; inflammatory alterations of ameloblasts, and fissures in the enamel. In isolated instances, severe inflammatory changes in the bone marrow were observed.

The examinations revealed that roentgenization can produce damage to tooth structures, especially to the pulp, odontoblasts, ameloblasts and the alveolar bone. All facial bones and teeth with exposed roots appeared severely traumatized, and the majority of dental germs destroyed.

Saarstrasse 19, Mainz, Germany

Radiology and radiobiology in Sweden

(Radiologie und "Health Physics" in Schweden)

Walter Seelentag. *München.med.Wschr.* 98:1331-1333 Sept. 28, 1956

In Stockholm, the World Health Organization gave its first international course on radiology and radiobiology from November 11 to December 12, 1955. Physicians, dentists and public health officers from Belgium, Denmark, France, Germany, Iceland, Italy, the Netherlands, Norway, Sweden and Switzerland participated in this course which was directed by experts on radiobiology from the American atomic center in Oak Ridge.

The term (or its equivalent) "radiobiology" and the field it covers are unknown in Europe.

The course consisted of discussions on (1) the organization of centers for study of radiobiology in the United States and England; (2) the progress achieved in protection against unfavorable effects of radiant energy and radiant substances used in medical and dental diagnosis and treatment, and (3) the problems arising in measurement and calculation of adequate radiation protection and control, especially with regard to medical and dental application of alpha, beta, delta, infrared, roentgen, supersonic, titanium and ultraviolet rays.

All roentgen ray institutes in Sweden are checked periodically by the Institute for Radiophysics in Stockholm. The medical and dental personnel working with roentgen and other rays are subjected regularly to blood tests, and their protection against damaging effects is constantly supervised.

The treatment of malignant tumors is concentrated in a few roentgenologic institutes, the largest being "Radiumhemmet." Physicists there assist in treatment planning with telecobalt and teleradium. In all instances, the indication and treatment is discussed by the treating physician or dentist with the staff of roentgentherapists.

Radiumhemmet has facilities for angiography (in series), deep roentgenotherapy, and telecurietherapy and possesses a comparatively powerful synchro-cyclotron.

▼

Plantation

Evaluation of the bicuspid single-tooth subperiosteal implant for fixed crown

Roy L. Bodine, Jr. *J.Implant Den.* 3:12-24 Nov. 1956

Five subperiosteal single-tooth bicuspid implants—three maxillary and two mandibular—were inserted between April 1952 and June 1953. A well-fitting subperiosteal mesh, flaring buccally and lingually, made from a direct bone impression, finished with a carefully occluded acrylic crown, was used in all five instances. Four year follow-ups revealed the failure of all three maxillary implants after an average of 12 months. The two mandibular implants already have lasted an average of 40 months and one is still in place.

The bone overlying the maxillary sinus seems unable to support the stresses of an implant framework. Resorption causes an insetting into the bone on the palatal side with a simultaneous exfoliation on the buccal side. Apparently there is a drifting of the entire implant substructure buccally. The bone of the mandibular bicuspid region holds up remarkably well under the single-tooth implant stresses, although the length of time they can be expected to last is uncertain.

Single-tooth maxillary bicuspid implants of this type should not be made. Similar mandibular implants, although they have a much longer life, are of dubious practical value.

Facts elicited from this research with the single-tooth subperiosteal implant have only limited application to the much better tolerated mandibular complete-arch implant denture.

P.O. Box 172, William Beaumont Army Hospital, El Paso, Texas

Transplantation of muscles and tendons in facial paralysis

(Muskel- und Sehnentransplantation bei Fazialis-Parese)

P. E. Aschan. *Fortschr.Kief.Ges.Chir.* 2:143-144, 1956

At the Tilka Military Hospital of Helsinki, Finland, 45 patients afflicted with facial paralysis were treated recently.

In the majority of instances, the facial paralysis had been caused by trauma, war injuries or postoperative complications. In the minority of instances, partial peripheral paralysis of the facial nerve occurred spontaneously.

Three different treatment methods were used: (1) transplantation of muscles; (2) transplantation of fascia, and (3) combined transplantation of muscles and tendons.

The results obtained with transplantation of muscles were not as favorable as those achieved with transplantation of fascia. In younger patients, the combined transplantation of muscles and tendons was especially successful.

In instances of peripheral facial paralysis caused by lesions of the facial nerve and resulting in characteristic distortion of the face, the activity of the temporal muscles can be restored by autoplastic muscle transplantation, tendon transplantation or fascioplasty.

A small incision is made in each corner of the mouth. Two muscle grafts, 4 mm. wide, are taken from the patient's thigh with Lane's fasciotome. A Blair needle is used to insert the first strip through the incision on the paralyzed side. The

graft then is drawn upward and fastened to the previously separated portion of the muscle. Later this strip is stretched downward, the corner of the mouth is lifted, and the second graft is firmly fastened to the first one.

Subcutaneously and deep, the first graft is drawn into position above the mouth, and the second below the mouth. On the unparalyzed corner of the mouth, the grafts are attached to each other.

Favorable results of transplantation of muscles and tendons can be obtained only when the patient is willing to undergo postoperative exercises regularly to train his facial muscles to achieve and maintain normal function. The oral surgeon, therefore, has to depend on the energy, intelligence and cooperation of his patient.

At the Tilka Hospital, the most favorable results were obtained in men between 20 and 40 years old. In children, women and older men, the results were less satisfactory.

In all instances, however, the symmetry of the face has been restored or, at least, immensely improved.

Tilka Military Hospital, Helsinki, Finland

▼

Surgical technics

Surgical treatment of prognathism

(Beitrag zur operativen Behandlung der Progenie)

K. Anspach. *Österr.Zschr.Zahnhk.* 10:219-220 Dec. 1956

The overdevelopment or underdevelopment of either jaw may be caused by disease, trauma or atavism. Patients with pronounced prognathism which had not been treated orthodontically when improvable, or who were beyond orthodontic treatment from the beginning, are proper subjects for surgical intervention.

Deformities of this kind easily become associated with severe psychic disturbances. The patients become introverts, acquire inferiority complexes, are morose, and suffer from mental anguish. Functional disabilities may arise, including speech defects, improper mastication and inadequate nutrition.

Surgical intervention is performed to achieve the following results: (1) esthetic improvement; (2) correct occlusion, and (3) proper function of the mandible.

Three surgical technics can be used such as (1) ostectomy of a portion of the horizontal ramus; (2) osteotomy of the ascending ramus, and (3) bicondylar resection.

In 1918, Ernst recommended a method in which the entire operation was performed with a single intraoral incision. This method, although modified and simplified, still is the procedure of choice at the Dental Clinic and Polyclinic of the University of Bonn, Germany.

In the intraoral approach, the periosteum is detached from the inner and outer surface of the ascending ramus with little or no interference with other anatomic structures. Because the masticatory muscles are not included in the operative procedure, trismus is not encountered. The mandibular sheath with the inferior alveolar nerve and blood vessels is severed but tissue regeneration will take place easily and rapidly. Neither facial paralysis nor extraoral fistulas occur as postoperative complications. Control of the fragments during surgery and postoperatively is facilitated by extraoral use of specially constructed hooks.

After ostectomy, the mandibular fragments are easily aligned to their new relationship. Postoperative adjustments, if necessary, can be accomplished in a lateral or posterior direction by the use of lock nuts and connecting bars. These extraoral appliances obtain immobilization without wiring of the teeth for a comparatively long time.

There are many surgical methods available for correction of prognathism, and, therefore, the method best suited for each instance should be selected.

Ernst's method, modified and simplified, has the following advantages: (1) hemorrhages are controlled; (2) damage to the facial nerve or its branches is avoided; (3) scar formation is less visible; (4) masticatory function is improved; (5) the appearance of the face is improved and (6) the patient has a better outlook on life.

The only disadvantage is that the procedure is more difficult and time-consuming.

The results achieved at the Dental Clinic and Polyclinic of the University of Bonn, however, prove that the advantages outweigh the disadvantages considerably.

Koblenzer Strasse 100/104, Bonn, Germany

Pyoktanin in surgical treatment of oroantral fistulas (Pyoktanin bei der operativen Behandlung von Nebenhöhlenfisteln)

J. Wymer. *Chirurgie* 27:499-507 Nov. 1956

Oroantral fistulas usually occur on the sites of old or imperfectly healed perforations into the maxillary antrum from within the oral cavity. Occasionally they are caused by the destruction of the bone which forms the floor and walls of the antrum. Both traumas result in a fistulous channeling through the soft tissue to the external surface of the overlying mucous membrane.

Surgical treatment of oroantral fistulas is one of the most thankless tasks in oral surgery. Postoperative recurrence of fistulas at the same site is frequent. During surgery, severe injury to the surrounding tissue often is unavoidable. These difficulties have led to the belief, which is shared by many oral surgeons, that conservative treatment of oroantral fistulas is preferable to surgery. The prognosis of conservative treatment of all types of fistulas, however, is seldom favorable.

Negative results of surgical treatment of oroantral fistulas, often reported in the literature, mainly were caused by the fact that the elimination of the fistula was not followed up by removal of the fistulous branches.

These widely ramified branches can be found more easily if, before surgery is attempted, these minute canaliculi are established clearly by staining with methylene blue or indigo carmine. Although such staining is sufficient to determine whether a complete or incomplete fistula exists, the slightest hemorrhage will wash the stains away, and the fine fistulous branches remain hidden.

For staining fistulas, the author uses and recommends a concentrated gentian violet (Pyoktanin) solution which stains the tissue deep black and renders even the smallest branch of the oroantral fistula detectable. This staining method causes no local, general or allergic complication.

The surgical procedure can then be performed by using the customary methods. In the preliminary preparation of an exact pattern, this staining method eliminates guesswork and approximation. The actual operating time is immensely reduced, and, thereby, the potential of surgical shock. All sutures can be inserted over firm bony support, and can be removed in about one week.

Bavariaring 17, Munich 15, Germany

Surgical treatment in recurrent dislocations of the temporomandibular joint (Eine neue und einfache chirurgische Behandlungsmethode der habituellen Kiefergelenkluxation)

Martin Herrmann. *Fortschr.Kief.Ges.Chir.* 2:234-235, 1956

Recurrent dislocations of the temporomandibular joint or recurrent incomplete or partial dislocations which usually are accompanied by clicking noises whenever the mouth is opened or closed, can be treated by inserting for about six months orthodontic appliances designed to restrict the movements of the jaws.

In instances in which this orthodontic treatment fails, surgical intervention in the region of the temporomandibular joint and its surrounding structures is required. The operation consists mainly of the removal of the interarticular fibrocartilage, bone grafting and shortening of the ligaments.

Frequently, surgery of the temporomandibular joint is accompanied by difficulties during the operation and by unforeseen secondary complications.

To overcome these difficulties, an attempt was made at the Dental Clinic and Polyclinic of the University of Mainz, Germany, to correct recurrent dislocations of the temporomandibular joint by preventing the maximal opening of the mouth.

From 1 to 2 cm. of the mucous membrane was removed from the region opposite the first and the third molar, and the wound was closed by a single suture.

During the first postoperative week, all movements of the jaws were restricted, and later the scar formation prevented the mouth from being opened too widely or too suddenly.

In instances in which this surgical procedure failed to obtain the desired degree of narrowing of the mouth, the intervention was repeated either on the same or on the other side.

Saarstrasse 19, Mainz, Germany

Summary of an orthopedic approach to cleft palate

Denis Browne. *Fortschr.Kief.Ges.Chir.* 2:227-228, 1956

The orthopedic approach to the problem of cleft lip and palate is entirely new. The operation consists mainly of applying to the muscles of the palate the principles which guide orthopedic surgeons the world over.

The author's method of connecting the actual ends of the cleft in the sphincter provides more operative freedom than can be obtained with customary technics. The sphincter remains in the position of closure during the healing period, a procedure similar to that used in the treatment of a rupture of the quadriceps by leaving the knee extended instead of flexed.

This orthopedic approach to cleft palate which is based on theory and practice of a closure of the nasopharynx does not require an abnormal contractility of the muscles as is required if the methods of Dorrance, Wardill or Whillis are used. The author's method gives the muscles of the involved region rational functions which can be reproduced easily in the working model.

This surgical technic is the only one known in which the nasopharynx can be demonstrated to open and close when a surgical gag is used.

In several hundred cleft palate patients, this technic has been used without fatal outcome or breakdown. In the majority of instances, postoperative routine speech therapy was not necessary.

No deformation of the palatal arch occurred, and only in instances of severe degree of malformation was collaboration with an orthodontist required.

By the use of the author's technics in the use of a surgical gag and in suturing, the average time of the operation can be reduced to about 45 minutes although the suturing is more complicated than that in customary cleft palate operations.

46, Harley Street, London W. 1, England

▼ Fractures

Medical aspects of automotive crash injury research

Paul W. Braunstein. *J.A.M.A.* 163:249-255 Jan. 26, 1957

More than 30,000 lives are lost and 1,000,000 people injured annually in automobile accidents. To determine the medical findings that might be expected in the 1,000,000 persons injured by such accidents each year, 1,000 injury-producing accidents were studied. Of the 2,253 occupants involved in the 1,000 accidents, 1,678 (74.5 per cent) were injured to some degree. Of those injuries sustained, only half could be diagnosed as of a minor degree.

Injuries to the head alone were the most frequent, followed by injuries with a combination of head and lower extremity involvement. Almost two thirds of the injuries involved more than one body region.

Of all persons injured, 72.3 per cent received a head injury; 44.7 per cent of all injured sustained a minor head injury. The latter usually require a minimal expenditure of time in examination and treatment. Another 12.9 per cent of the injured patients sustained a nondangerous head injury; 3 per cent of all injured persons received a dangerous head injury, and 3.9 per cent received a fatal head injury. One in ten head injuries was dangerous or fatal.

All persons with head injury suffered some soft tissue trauma, and many of the latter instances were minor in degree. In 7.7 per cent of the head injuries there were skull fractures either alone or combined with facial fractures or soft tissue injury. Of these skull fractures, 62.5 per cent

proved fatal, and these occurred to 2.7 per cent of all injured persons and represented 3.7 per cent of all head injuries. Head injuries of all types had a 5.4 per cent fatality rate, whereas skull fractures had a 62.5 per cent mortality rate.

Although these facial fractures and soft tissue injuries, being largely lacerative and abrasive, are not immediately dangerous to life, they constitute an immediate problem for surgical care.

The epidemiologic approach to auto crash injury, combined with education of drivers, better highway engineering and other safety efforts, give grounds for hope that this picture can be changed.

316 East Sixty-first Street, New York, N. Y.

Combination of wire and acrylic splints in treatment of fractures of the jaws
(Die Kombination der Draht- und Prothesenschiene bei der Kieferbruchbehandlung)

F. Wirth. *Fortschr.Kief.Ges.Chir.* 2:97-101, 1956

The disadvantages of using splints for immobilization in the treatment of fractures of the jaws have been discussed frequently in dental literature.

At the department of oral surgery of the Dental Clinic of the University of Graz, Austria, the following treatment method is used:

1. An acrylic splint, which encloses the teeth, is anchored firmly by means of wires which are passed through holes drilled into the splint. These wires then are twisted into small loops on the buccal surface.

2. The acrylic splint is preprocessed to the desired shape and, while it is still soft and adaptable, contoured to conform to the dental arch.

3. The wire ligatures, which secure the correct position of the splint, also ensure that the fragments retain perfect apposition.

In instances in which fracture of the dentigerous parts of the mandible has occurred, no further immobilization is required.

In instances in which intermaxillary wiring is necessary to obtain the correct apposition of the fragments, wires can be passed through the loops of the mandibular splint.

This method of combining wire and acrylic splints in treating fractures of the jaws has all the advantages of the customary splinting, but construction, preparation and insertion consume less time, and the results obtained are highly satisfactory.

Restitution of normal function of the jaws, however, should be sought at the earliest possible moment.

Landeskrankenhaus, Graz, Austria

▼ Miscellaneous

Foreign bodies in dental practice

Ian M. Smith. *J.Michigan D.A.* 38:293-294 Oct. 1956

An average of 3 per cent of all patients have foreign bodies present in the oral tissues. In edentulous patients or in patients missing all teeth in either the maxilla or mandible, a foreign body incidence of 35.5 per cent was found.

The removal of foreign bodies is indicated in the following circumstances: if they are lying in both bone and soft tissues; if they are lying in soft tissues that would be compressed against bone or a denture; if they are present in young patients; if they cause undesirable ridge contours; if they create nerve pressures; if they are composed of iron, steel and so forth; if they are a source of physical or mental irritation to the patient, and if an associated radiolucent area is present.

The surgical removal of foreign bodies is contraindicated in the following circumstances: if the tissue derangement normally incident to the operation overbalances the value of the foreign body removal; if the object is bacteriostatic and physiologically inert; if no radiolucent area is present, especially if the foreign body is encased completely in bone; if the patient is old and the foreign body has been present for a long time, and if the location is such that untoward results are unlikely.

Doctoral and Masters' dissertations

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In this column each month are listed recent Doctoral and Masters' dissertations of dental interest, accepted by the dental schools or graduate schools in partial fulfillment for advanced degrees. Copies of many of these theses are available from the schools through interlibrary loan. Copies are not available from the American Dental Association. Addresses of all schools will be provided on request.

An analysis of dental casts of patients made before, at completion, and at least one year after retention. *Charles Frederic Swift. 1956.* M.S. *University of Southern California.*

A cephalometric evaluation of extraoral anchorage. *Antonio Cucalon, Jr. 1955.* M.S. *University of Southern California.*

A clinical evaluation of hyaluronidase in the prevention of postoperative complications. *Thomas S. Shuttee. 1956.* M.S. *Georgetown University.*

Determination of some compressive properties of human enamel and dentin. *John W. Stanford. 1956.* M.S. *Georgetown University.*

The variations in skeletal and denture patterns in excellent adult facial types. A cephalometric appraisal in norma lateralis. *Samuel Goldsman. 1956.* M.S.D. *Indiana University.*

Cephalometric analysis of twelve year old females. *Edwin Arnold Gendron. 1956.* M.S. *University of North Carolina.*

A cephalometric radiographic study of the condyle movement from physiological rest to occlusion. *George Junior Orr. 1956.* M.S. *University of North Carolina.*

A serial roentgenographic cephalometric study using Wylie and Downs' analyses. *David Leo Ferrell, Jr. 1955.* M.SC. *Ohio State University.*

A study of the effects of stress upon the alveolar bone of the Syrian hamster. *Peter Francis Fedi, Jr. 1956.* M.SC. *Ohio State University.*

Serial determination of the carbonate, citrate, phosphate, calcium and nitrogen content of enamel. *Samuel C. Peckham. 1956.* M.S. *Georgetown University.*

The influence of geometric cuspless occlusal patterns on the chewing efficiency of full dentures. *A. Albert Yurkstas. 1956.* M.S. *Tufts University.*

Adrenochrome monosemicarbazone sodium salicylate: an evaluation of its hemostatic properties in oral surgery. *Robert Perkins. 1956.* M.D.S. *Tufts University.*

Chemotherapy in dentistry (Chemioterapia in stomatologia). *L. Enicanti. 1955.* DR.MED.DENT. *Dental Clinic, University of Milano, Italy.*

Benign tumors in the oral cavity (Tumori benigni del cavo orale). *P. Reguzzoni. 1955.* DR.MED.DENT. *Dental Clinic, University of Milano, Italy.*

Measuring the pliability of the oral mucosa beneath lower partial dentures (Messungen der Nachgiebigkeit der Kieferschleimhaut unter partiellen Prothesen im Unterkiefer). *Werner Gärtner. 1955.* DR.MED.DENT. *Free University of Berlin, Germany.*

Embryologic studies of cleft lip, upper jaw, hard and soft palate (Embriologie der Lippen-Kiefer-Gaumenspalten). *Jochen Gleditsch. 1955.* DR. MED.DENT. *Free University of Berlin, Germany.*

Tuberculosis of the lips (Über die Tuberkulose der Lippe). *Rudolf Koch. 1955.* DR.MED.DENT. *University of Bonn, Germany.*

Oral and dental diseases with regard to the cause of trigeminal neuralgia (Ein Beitrag zur Ätiologie der Trigeminusneuralgie: Unter besonderer Berücksichtigung der Zahn- und Kieferkrankheiten). *Fritz Müller. 1955.* DR.MED.DENT. *University of Bonn, Germany.*

Roentgenographic studies in instances of orthodontic treatment during the period of the changing dentition (Röntgenstudien an kieferorthopädischen Fällen des Wechselgebisses). *Margret Mingele. 1955.* DR.MED.DENT. *University of Cologne, Germany.*

Alcohol injection in treatment of trigeminal neuralgia (Die Alkohol Injektion bei der Trigeminusneuralgie). *Dieter Schienbein. 1955.* DR. MED.DENT. *University of Cologne, Germany.*

The structures of organic dentin: a study of the dentin of animals and humans in which cleavage tests were used (Organische Dentinstrukturen: Eine Studie mittels der Spaltmethode am Zahnbein des Menschen und einiger Tiere). *Hans Wunderer. 1955.* DR.MED.DENT. *Medical Academy of Düsseldorf, Germany.*

Mental deficiencies and defects of the palate (Geisteskrankheiten und Gaumenformen). *Marianne Behrens-Wenzel. 1955.* DR.MED.DENT. *Medical Academy of Düsseldorf, Germany.*

Sarcomas of the oral cavity and their treatment (Die Sarkome der Mundhöhle und deren Therapie). *Karl Bergrath. 1955.* DR.MED.DENT. *University of Erlangen, Germany.*

Pathology and surgical treatment of cleft lip, upper jaw, hard and soft palate as a holistic problem (Pathologie und operative Therapie der Lippen-, Kiefer-, Gaumenspalten als Gesamtproblem). *Reinhart Faber. 1955.* DR.MED.DENT. *University of Erlangen, Germany.*

Perforations of the maxillary sinus occurring after tooth extractions (Die Häufigkeit der Kieferhöhlenperforationen bei Zahnextraktionen). *Horst Beckendorf. 1954.* DR.MED.DENT. *University of Göttingen, Germany.*

Three-quarter crowns serving as an anchorage for bridges (Teilkronen als Brückenanker). *Fritz Brauns. 1954.* DR.MED.DENT. *University of Göttingen, Germany.*

Animal experiments with local anesthetics—Panthocaine, procaine hydrochloride and Percaine—and convulsants—Coramine and picrotoxin —and Megaphen (Tierexperimentelle Untersuchungen über die Beeinflussung der Wirkung einiger Lokalanästhetika—Pantocain, Novocain, Percain—und einiger krampferregender Mittel—Coramin, Pikrotoxin—durch Megaphen). *Friedrich Grüninger. 1954.* DR.MED.DENT. *University of Heidelberg, Germany.*

Method of pulpectomy treatment by using penicillin (Amputatsionnyj metod letshenija pulpitov s primenenijem penitsillina). *E. N. Rensova. 1955.* CAND. MED. SC. *University of Kharkow, U.S.S.R.*

Microbic groups in different stages of dental caries (Mikrobnye assotsiatsiji pri razlitshnych stadijach kariesa zubov). *E. P. Datsenko. 1955.* CAND. MED. SC. *University of Kiev, U.S.S.R.*

Basic steps toward the development of stomatologic aid in the cities of RSFSR (Osnovnye etapi razvitija stomatologitsheskoj pomostshi v gorodach RSFSR.) *V. V. Zhilina. 1955.* CAND. MED. SC. *University of Moscow, U.S.S.R.*

Reaction of pulp to grinding of teeth and the significance of local thorium sodium application (Reaktsija pulpi pri shlifovaniji zubov i znatshenije mestnogo primenenija ftoristogo natrija). *Z. P. Shiraka. 1955.* CAND. MED. SC. *University of Riga, U.S.S.R.*

Cleft palate and plastic surgery (Rastshelina njoba i plastika ejo). *I. P. Bakulis. 1955.* CAND. MED. SC. *University of Riga, U.S.S.R.*

Clinical and pathomorphological study of radiculodental cysts (K voprosu kliniki i patomorfologiji zubnych okolokornevych i okolokoronkovych kist). *N. I. Zhgenti. 1955.* CAND. MED. SC. *University of Tiflis, U.S.S.R.*

Skin graft operation on face and jaws (Svobodnaja kozhnaja plastika v tsheljustno-litsevoj oblasti). *B. I. Stshipatshova. 1955.* CAND. MED. SC. *University of Sverdlovsk, U.S.S.R.*

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